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Issue 41 February/March 1988 $2.95

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Popular Woodworking

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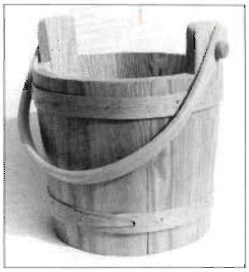
On the Cover

You don't have to have special cooper's tools to make these decorative buckets. On page 34 Warren Asa shows how to fashion cooperage with ordinary cabinetmaking tools in a challenging project that's not quite as difficult as you might think. Though they're not necessarily water–tight, they are a lot of fun to make.



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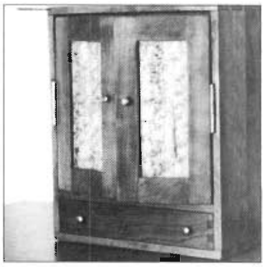

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Clear Cuts

Boy did we ever mess up! Believe me, the faces around here are sure red, and it's not just from the cold!

As many of you noticed, there was a serious error in last issue's cover story "Build a Box of Dominoes" by Hugh Foster. I am truly sorry if anyone wasted any wood trying to make this project according to the information we presented in the article.

The mistake we made was that we forgot to put a headline across the whole page that read, "How Many Things Can You Find Wrong With This Article?"

You've seen those puzzles in children's magazines where they have people wearing flower pots on their heads and riding bicycles with square wheels. The challenge is to see how many things you can find wrong with the picture. Well, that was the idea behind our domino project - we just forgot to tell you.

Several readers seemed to catch on anyway and sent in their lists, along with suggestions about how to change the article so that you could *actually build the project* if you wanted to.

Everyone who wrote in caught the fact that if you make the full sequence of dominoes from double zero to double nine, you'll have 55 dominoes instead of the 40 that the box was designed for. (The author tells me he designed the box for 40 and just stopped drilling holes when he had that many.) However, there were other mistakes that some readers caught and others didn't. Jack Brown of Rancho Mirage, California tried the hardest. He was the only one to note the misplaced arrow in Figure 1 that refers to a rabbet but points to the cutoff line for separating the lid. He also suggests that the rabbet should be 1/4" deep X 1/2" wide instead of 1/4" wide X 1/2" deep. He'd be right if the rabbet were to be cut on a table saw; but since we were *routing* it with the box already assembled, this does not actually count as a mistake. He also felt that a 3/8" Forstner bit was not suitable for 3/8" dowels, but we're going to have to disqualify that one, too. Anytime you want dowel stock to fit a certain size hole, you should drill a hole in a piece of hardwood with the bit you're going to use and drive the dowel stock through the piece so it will be properly sized. Nice try though, Jack.

Earl Dickson of San Diego, California had the most correct answers; he even caught the discrepancies in the drilling pattern for the two's and three's between Figure 3 and the cover photo (diagonal vs. horizontal). He also provided this cutting list that gives workable dimensions (I promise) for a box that will hold five rows of eleven dominoes. His box is constructed by rabbeting all around the top and bottom (C) and just the ends of the sides (A).

Corrected Box of Dominoes

Cutting List

Qty	Part	Finished Size T	W	L	Piece
2	A	1/2"	5 1/2"	11 1/8"	sides
2	B	1/2"	5 1/2"	6 1/8"	ends
2	C	1/2"	6 1/2"	11 1/8"	top & bottom
55	D	1/2"	2"	4 1/4"	domino blanks
495	E	3/8" diameter		1/4"	plugs

Unfortunately, none of the people who wrote in complained about the missing circled letters in Figure 1 for identifying the pieces, or the missing piece names in the cutting list. Since no one caught *all* the errors, we can't award the prize which was to have been round-trip airfare to the offices of *Popular Woodworking* and the chance to flog the editor.

David M. Camp

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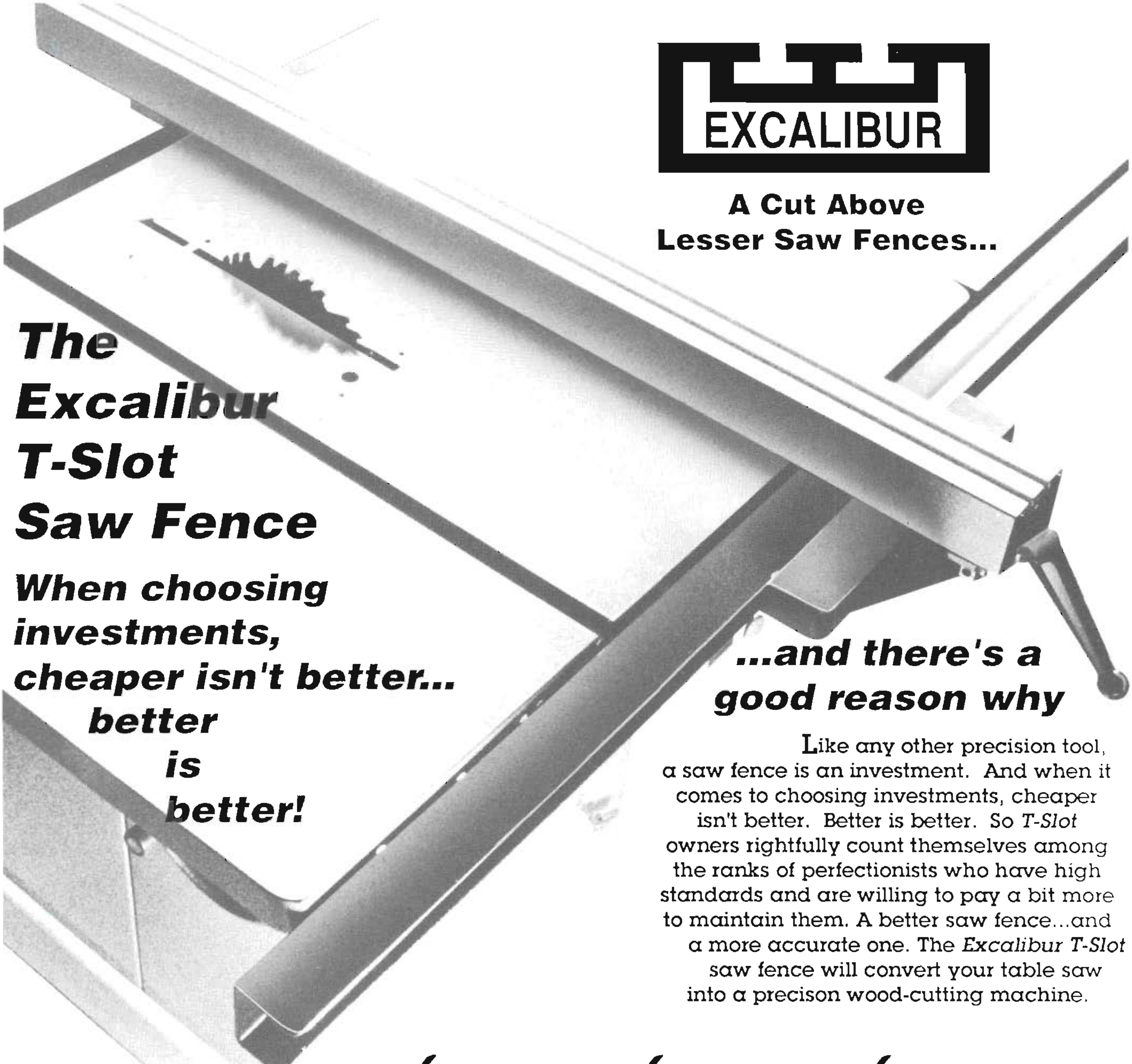

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Popular Woodworking *welcomes your comments, pro or con, about articles we publish. Send your letters to: Editor,* Popular Woodworking, *1300 Galaxy Way, Concord, CA 94520. Letters may be edited for publication.*

Amazing Origins

In the article "The Amazing Folding Stool" (February/March 1987) the author mentioned that he didn't know where the design originated. I thought you might like to know that the design is from China. Stools like this can be purchased in any of the Chinese Merchandise Emporiums in Hong Kong for about $3.00 each. Almost every home in Hong Kong has one or more of these stools, as they are very useful where space is at a premium.

Rupert Bond
San Francisco, CA

Toolbox Questions

I enjoyed "The Joiner's Toolbox" (August/September 1987), but I have a few questions. First, you didn't say much about the front and back panels. I guess they are raised panels out of 1/2" stock, but the whole box is made from 1/2" stock, so how wide a groove did you make in the frame to accept the panel? Something must have been mighty thin - either the panel edge or the remaining stock in the frame.

What holds the saws in place on the door? Is the panel saw a short version? My saws require at least 30" and your overall box length is 26".

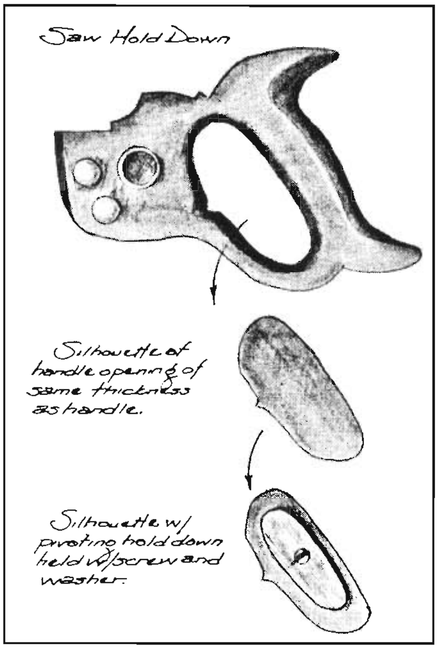
The sketch on page 33 shows the drawer runners to be 1/2" wide and 1/2" thick, but in the photo on page 31 the piece looks 2-1/2 to 3 times wider than it is thick.

What method of joining was used to attach the back panel, front panel and front to the carcase? A mention of the wood species you used would have been helpful; it looks like Philippine mahogany to me.

I, for one, would have appreciated more accurate and detailed drawings and descriptions and less anecdotes about Mr. L.

Stephen Cox
Missoula, MT

The author replies: Regarding the front and back panels: The frames are, in fact, 1/2" stock, but the panel is not a raised panel, only 1/4" plywood. Yes, the channel only leaves 1/8" of frame on either side which is thin, but the wood that I used is doussie (see Issue #20, August/September 1984), a very durable exotic hardwood. Even so, any good grade hardwood would work as well, as long as one is careful not to rupture the integrity of the channel during construction. After eight years of falling off the back of a pickup, of being rained upon and dropped, my box is still sound.


Saw Hold Down
Silhouette of handle opening of same thickness as handle.
Silhouette w/ pivoting hold down held w/screw and washer.

Joe Petrovich

The saws were just resting on the top in the photo to show the traditional arrangement. I seldom use those saws as I prefer a Japanese-style combination saw that mounts in a cradle against the back of the open area in the bottom of the box. Traditionally, however, the saws were mounted in the lid and secured with a pivoting hold-down through the handle (see illustration above). The blade was secured by a piece of wood that is kerfed to accept it.

The thickness of the drawer runners is, in fact, 1/2". Apparently the photo is a little distorted. 1/2" is really all that is required.

To join the front and back panels to the box I simply relied on a glue joint. I would recommend, however, that if you are likely to have your box outdoors, you should use a plastic resin glue. The added moisture-resistance is worth the additional effort.

J. Petrovich
Salinas, CA

Elm Quarantine

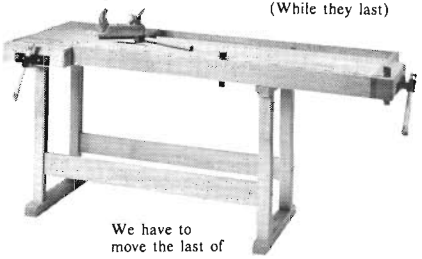
As an amateur woodworker, I was intrigued by your recent article "Elm: America's Forgotten Wood" (October/November 1987). However, as the manager of California's Dutch Elm Disease (DED) Project, I found the article misleading.

The article gives the impression that it's acceptable to salvage elm wood. I suspect the author lives in the midwest or in eastern states where DED has nearly run its course and state and local quarantines have been dropped.

Although it may be legal to salvage elm wood in *some* states, California state regulations pertaining to the DED quarantine prohibit this practice. These laws were enacted to reduce the spread of the disease within the state. The reader should be cautioned that various states and local quarantines and ordinances may apply.

You did correctly recommend removing the bark from elm wood where it is permissible to salvage elm material. In addition, your suggestion to coordinate with local road crews and tree experts is good.

Bruce W. Hagen, Program Manager
Dutch Elm Disease Project
P.O. Box 820
Santa Rosa, CA 95402-0820



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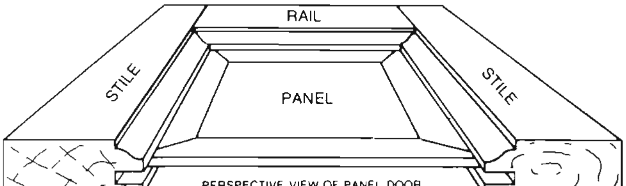

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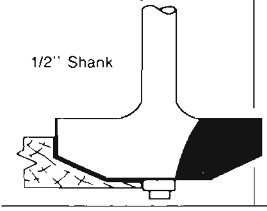

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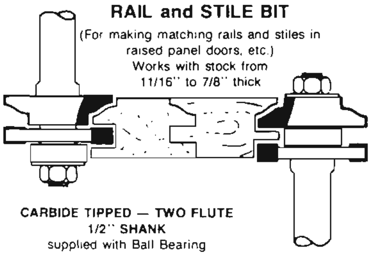

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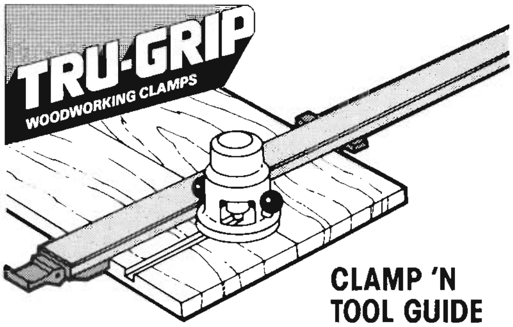

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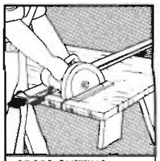

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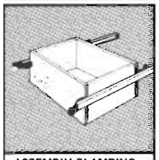

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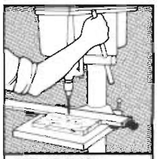

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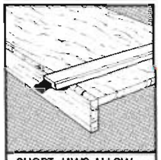

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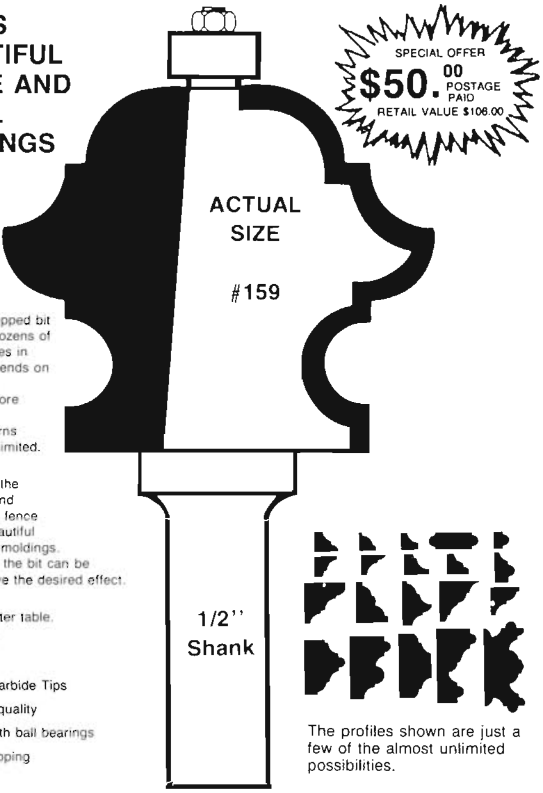

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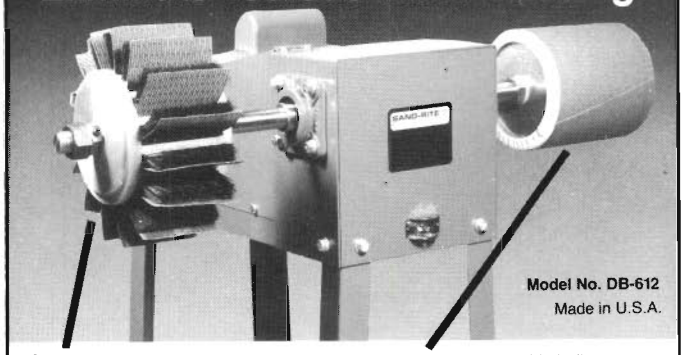

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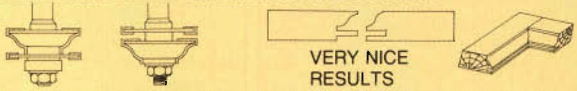

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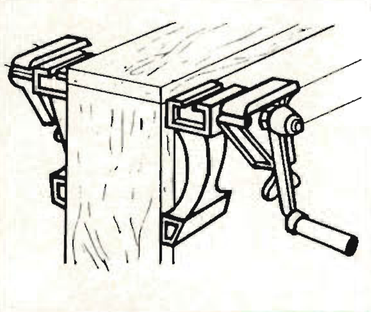

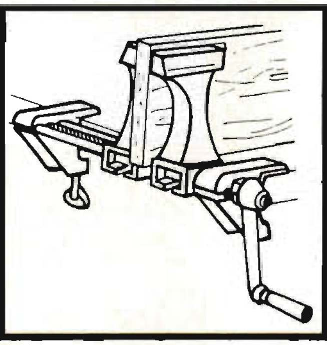

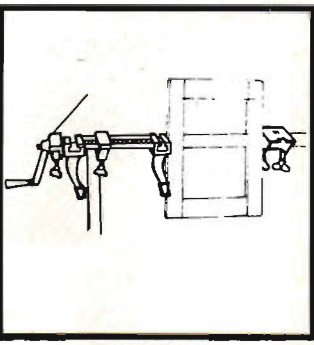

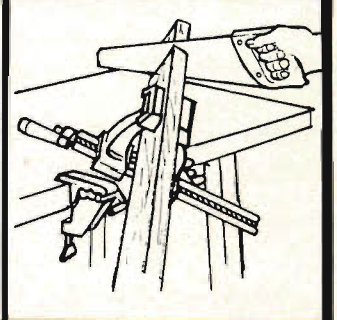

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Book Reviews

by Hugh Foster

Some Notable Books from TAB

Master Handbook of Woodworking Techniques and Projects, Second Edition by Percy W. Blandford (TAB Books, Inc., Blue Ridge Summit, PA 17214, ©1987) 361 pp., paperback, $15.95

This book about traditional cabinetmaking recognizes, "It is unlikely that many cabinetmakers using traditional methods could now find enough customers able to pay fair prices for their work and provide them with a living....The continuation of the skills of fine cabinetmaking must depend on amateurs who pursue their craft for the love of it and do not have to relate man-hours to income." He goes on to suggest that too many home shops are inferior copies of production shops, and that many amateur craftsmen might be more satisfied if they made more things that could not be mass-produced. People aiming to be skilled at our craft should have a thorough mastery of hand tools.

Many photos and uncluttered line drawings add to the text in which Blandford discusses hand and power tools with great clarity.Even sharpening is discussed clearly here. We get some clues about how to improvise around tools we don't yet own, and safety is stressed. Further chapters go on to treat joints - what's different here is that the joints are shown in relationship to one another so we can see how and why they work. Enough examples are given in the process of describing the many projects that the careful reader will come to remember and understand the interrelationships and be able to apply them intelligently.

After showing a fair variety of woodworking projects, each illustrating fundamentals of design, Blandford goes on to discuss the process of design, the reasons for adhering to tradition (simply put, over the years, people have found that these methods work!), and ways to simplify drawing so that even someone like me might have a chance to accomplish it.

Sometimes in the past I have found Blandford's work to be superficial, but this one is far superior to most of his earlier work. I can recommend this book to the attention of at least novice woodworkers without reservation.

The Portable Router Book by R. J. DeCristoforo (TAB Books, Inc., ©1987) 343 pp., paperback, $14.95

I knew this was my kind of book when the introduction said "As many professionals as amateurs are hurt in workshops; expertise doesn't guarantee safety. Obey the [safety] rules [in chapter 2]. 'Thinking' is your job. Even tools that can make some decisions for you electronically can't tell whether they are confronting wood or a finger..."

Chapter 1 offers a survey of routers that should help woodworkers who don't yet have one to wisely choose the router that will best meet your needs. Chapter 2's topic is safety, and the advice is timely. I can't tell whether this chapter has made me a better router user, but I do know that my attitude toward the tool sometimes crosses from respect into fear: it's so loud; its cutter swirls so fast; and it doesn't cut, it just pulverizes everything in its way. Rather than cut things freehand, DeCristoforo would have us use jigs and fixtures. He convinced me readily that it's safer that way.

I'd have gladly paid even more for the many useful jig plans that I find here. Besides the shopmade jigs, there are discussions of Porter-Cable's MOR-TEN and the Leigh dovetail jig, to name but two of the commercial jigs. A section on router tables discusses commercial and shopmade varieties. One interesting chapter focuses on the use of the router while attached to the radial arm saw, which is far more than mere pin-routing. A closing chapter deals with interesting gadgets to accessorize your router: Sears Bowl Crafter, the Router Crafter, the Mill-Rout, the Router Recreator, the Edge Crafter, and the Dupli-Carver are all discussed; more information about each of these might be useful, but that information might, indeed, have doubled the size of this already large book.

Eventually, an honest reviewer will have to compare this book to Patrick Spielman's **Router Handbook** (reviewed here by Alan Marks in Issue #20, August/September 1984). Yes, there is some overlap, but there is enough difference that I'd call the two books complementary rather than competitive. Spielman's has lived in my shop rather than in my bookcase for years; this book by DeCristoforo will be moving in "right next door." I'd hate to have to choose between them, and I suspect you'll feel the same way about it.

24 Router Projects by Percy W. Blandford (TAB Books, Inc., ©1987) 120 pp., paperback, $6.95

Even if you don't like all the projects in this book, you have to admit the price is right. There are no instructions about how to use the router, but the book was originally intended as a companion piece to DeCristoforo's *The Portable Router Book*, so it does a perfectly admirable job of fulfilling its function. Even if you don't feel you need DeCristoforo's book, you may find these plans useful. I'd like more photos, but Blandford draws these projects so clearly you are sure to know at a glance which you'd like to build. There are enough good ones here that the $6.95 seems indeed a bargain, almost too good to be true.

101 Kitchen Projects for the Woodworker by Percy W. Blandford (TAB Books, Inc., ©1987) 263 pp., paperback, $14.95

There's bound to be something here for your kitchen. Blandford's writing is clear, if too often bland (sorry). He's an excellent artist; in a few cases his drawings are nearly photographic, but overall, I have to fault the book for its lack of photos. The only photo here is on the cover. That may be enough to sell the book, but where are the photos that sell the projects (some of which, I'm having to guess, are dandies)? Since it's not possible to list the whole 101 projects here, I'll list them by categories, as does the Table of Contents: Boards, Trays, Small Storage Items, Tools and Utensils, Racks, Tables, Chairs and Stools, Island Units, and Shelves. I find Blandford's trays and chef's table to be especially intriguing, but to turn the oft–heard phrase just one more time, "So many projects, so little time..."

***Hugh Foster** is an English-teaching woodworker in Manitowoc, Wisconsin.*

Projects from Pine: 33 Plans for the Beginning Woodworker by James A. Jacobson (TAB Books, Inc., ©1987) 177 pp., paperback, $10.95

The first sixth of this book (two chapters) is devoted to preliminaries: how to buy a board, how the equipment works, etc. I've seen this stuff told better, but I've also seen worse.

There are projects for the kitchen, sewing room, and elsewhere around the house. Most of these patterns are *nice*, not too cute. They could lend themselves to mass production by profit-minded woodworkers almost as much as they'll lend themselves to feelings of accomplishment in the novice. Despite the slow start, I like this book.

A Master Carver's Legacy: Essentials of Wood Carving Technique by Brieuc Bouche (TAB Books, Inc., ©1986) 164 pp., hardback, $24.95

Brieuc Bouche served his woodcarving apprenticeship in France from 1922-1925. Ever since then, he has carved and taught others to carve, amassing over 40 years of teaching experience in California alone. Confident that most people can learn to carve well enough to achieve deep and lasting satisfaction, Bouche presents the woodcarver's equipment, graduated practices, thorough step-by-step instructions, and a great deal of encouragement. He even encourages us to go to the library and the bookstore to see how *others* have accomplished the same tasks.

After the basic carving techniques are described and illustrated, the book proceeds to seven graduated lessons. All seven are described in just over three typeset pages, followed by 40-some pages of photos that illustrate the steps so clearly that there is little chance of misunderstanding the directions. A third section of the book deals with special techniques needed for certain aspects of carving projects.

Overall, the book is interesting and useful. To get its full benefit, you would have to read and reread, then try the hands-on exercises, then check those against the photos and drawings provided. By the time you had completed the book in this fashion, I'm confident that you would know how to carve. PW

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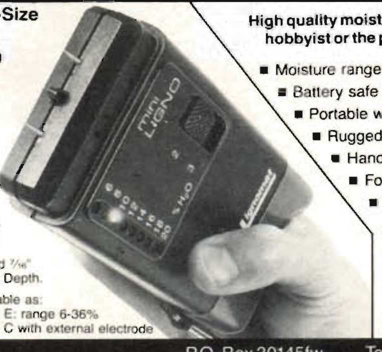

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Videoscene

by Alan Marks

Woodworking with John Parko, ©1986 by ROGA Enterprises, Inc., P.O. Box 2743, Cody, Wyoming 82414, 130 minutes, $29.95 plus $3.00 shipping

Quite an ambitious topic for two *hours' worth* of video, you say? You may be disappointed to find you still haven't mastered *all* aspects of woodworking after watching this tape. You will, however, have learned how to build a frame-and-panel oak chest. This in itself seems like a great idea. To my knowledge nobody has done a video with instructions for doing an individual project before, but that is essentially what this mistitled tape is about.

Unfortunately, I have a recurring problem: I have a lot of fixed ideas about how things ought to be done and about proper procedures, efficiency, use of materials, machinery and such. I am at a real loss when someone else does things differently. And it behooves me to say that very little of what John Parko does on this tape reflects the practices taught to me in days of yore. Parko studied woodworking at California State University at Long Beach and has a masters from the University of Wyoming. He seems to be a pretty likeable guy. So why doesn't he do things my way?

Having established that important parallel, let me say that from time to time while watching John construct his project, I felt like leaping from my seat, grabbing him and saying desperate things like, "No, John, not your fingers, use a brush for your glue!" or "Why on earth are you assembling your frames and panels without sanding them first?!" or "Don't use a carpenter's framing square for squaring up a cabinet!" Sometimes it was quite painful for me to endure.

The tape opens with what was for me a tedious recitation of the ten steps to be followed in construction, together with the approximate time it should take for each step. I did think that including the time was a good, original idea. That way, someone building the chest in a series of evenings can get an inkling of how much time to set aside.

In the cassette package, the publisher includes undimensioned front and side views of the chest, plus a cutting list and two details. This is not enough information, but for an additional two dollars and after perhaps a week's wait, you can have a more detailed drawing. I recommend that any publisher doing a "How To Build an XYZ" video should consider a more detailed drawing an essential part of the video and include it in the purchase price. If you can't fit a drawing of that size in the cassette box, include a postage-paid card so the purchaser can send you an address to which a drawing can be sent, free of charge.

I think this tape could benefit from a little reworking. There are many possibilities for tribulation and heartbreak that have not been pointed out. As it stands, I am afraid to recommend it to beginners because it could be hazardous to their enthusiasm, perhaps even fatal. Advanced woodworkers may well thumb their noses at some of the procedures outlined. I think it's a valiant first stab at something new, and I can imagine someone marketing full sets of plans plus videos and being very successful at it.

The Maine Art of Refinishing with Beau Belajonas, ©1985 by Pro-Fax, Inc., P.O. Box 2210, Twin City Plaza, Cambridge, MA 02141, 90 minutes, $59.99 plus $3 shipping

The start-up of this video really blew me away. It opens to frantic bluegrass guitar accompaniment and a peppy sideshow huckster-type with a broad New England accent welcomes the viewer to Camden, Maine, etc. The camera zeros in on a big gray pickup with a load driving into Camden. I can't quite make out what the load is. Then come a few scenic tourist views of Camden, Maine - the harbor featuring the same pickup truck driving past, then a close-up of water birds followed by a spectacular aerial retro-zoom of the whole community and it all has me really off balance. I start wondering what such stuff has to do with furniture refinishing. The truck pulls up in front of a small building with a sign that says "The Maine Art of Refinishing," but things start to pull together for me when I realize the pickup has furniture in it.and none other than Beau Belajonas springs from the cab. Kicking things off with an animated gesture, Beau tells us excitedly about a few choice demo pieces he has rounded up in his truck and gives a short rundown on how to use the video.

Sections of the video are set up to be run on an as-needed basis. No single piece of furniture will utilize all the information included in a particular section, so a viewer might even want to fast forward past some of it. The tape makes it easy to skip to the next section. A number shows in the upper right-hand corner of the TV screen for reference and changes for each new section. An index of sections and materials needed to carry out the steps for each procedure is included for reference with the cassette. The viewer just fast forwards until the number changes. The reference sheet ought to have included section numbers, but it does not. It is easy enough to write them in, however.

The list of section topics is as follows: stripping, bleaching, minor repairs, sanding, sealing, staining, final finish, and rub down and waxing. There is also a "bonus section" of small tips on restoration, cleaning of hardware, a sticky drawer fix, a quick polish, and brush cleaning. Finally, a sequence of before-and-after shots illustrates the dramatic change in Belajonas' original truckload of furniture.

The organization of this video beats everything else I've seen. Each section opens with a full list of the materials needed and tells how many minutes the section runs. It then shows a "still life" of all the required materials, and instruction begins. At the end of each section a text screen comes on and as Belajonas reviews items on a list of Important Points, each one is highlighted in turn.

I really appreciated the demonstrations on the uses of bleaching materials, staining and sealing, how to use oil pigments, how to seal in color, and how to glaze with shellac. Sometimes people do come to me for furniture repairs, though I prefer not to do them. I acquiesce from time to time and have run into situations where all of this information could have helped me enormously. I am sure that any woodworker will need this information

---

Alan Marks *is a cabinetmaker from Pacific Grove, California, and a contributing editor to PW.*

sooner or later, and watching a video makes ingesting it so much easier than reading a book.

If you have never done any major refinishing you will really feel encouraged to tackle it after watching this. What made it such a joy to watch is the rare combination of an enthusiastic, talented instructor and a top-notch professional job of presentation. I can recommend this one without any reservations whatever.

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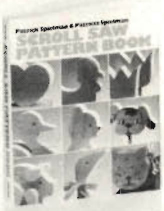

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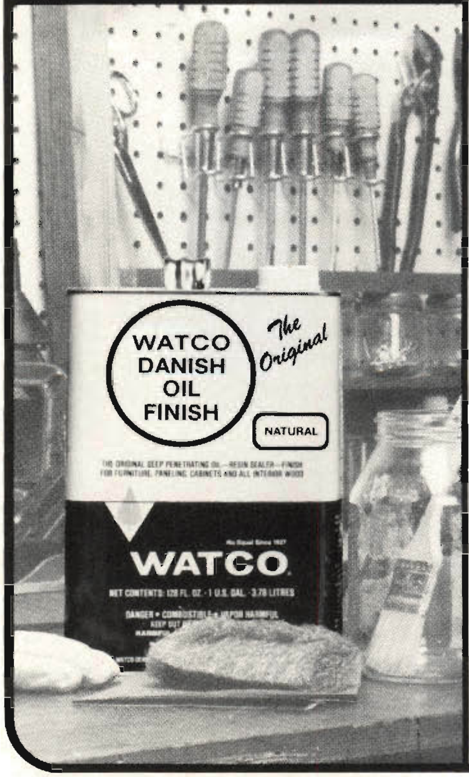

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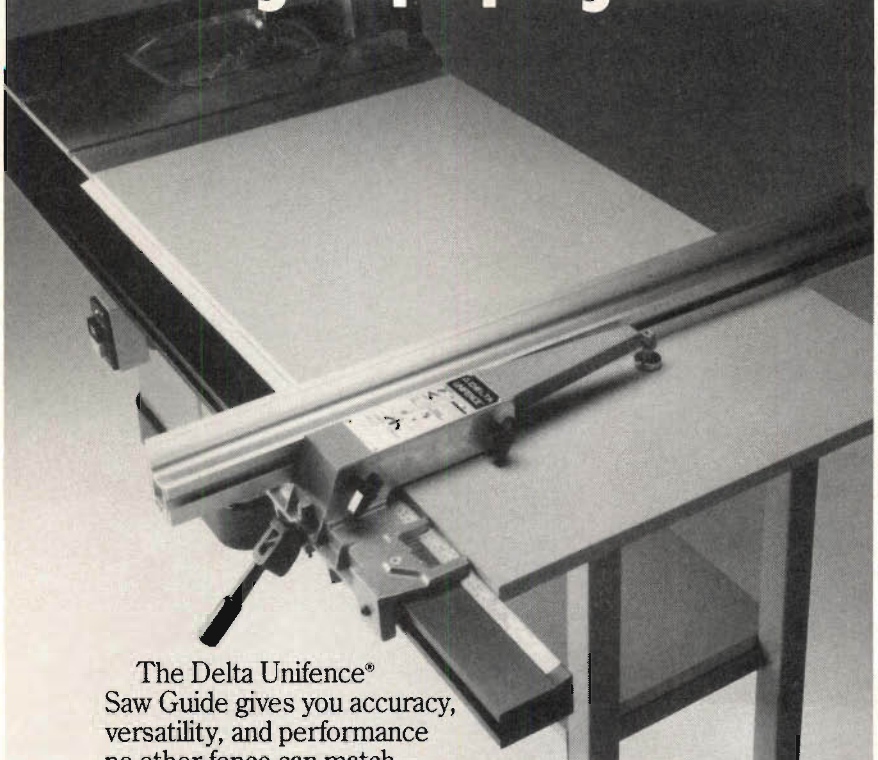

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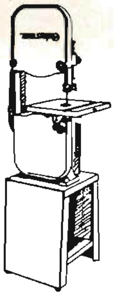

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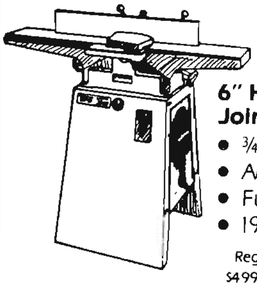

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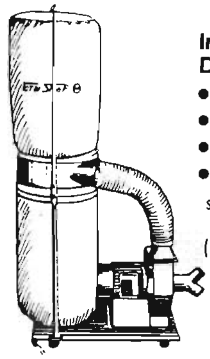

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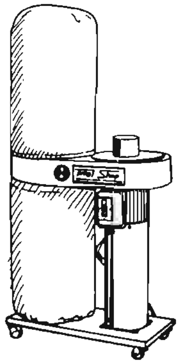

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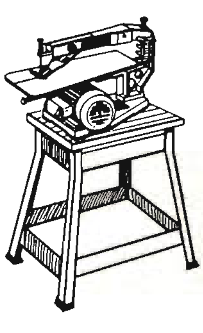

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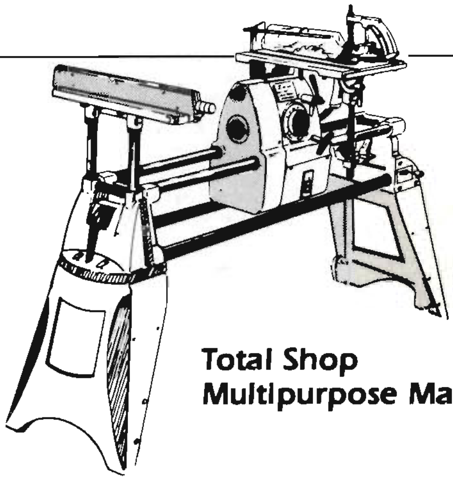

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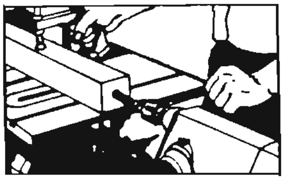

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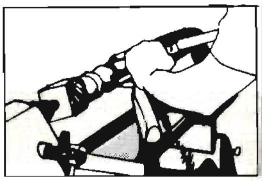

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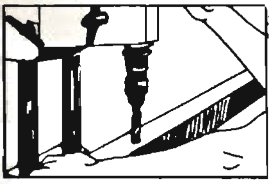

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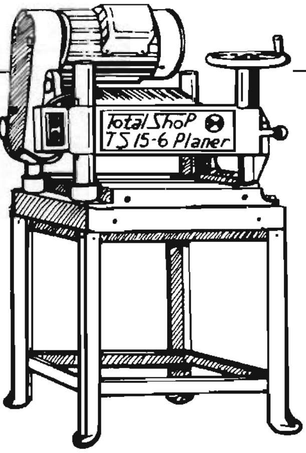

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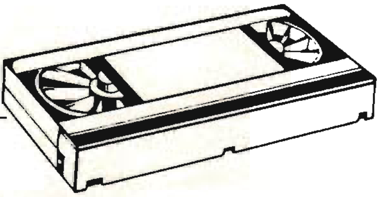

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The Business End

by William L. Smith

Deducting Education and Convention Expenses

If you own a woodworking business and you decide to attend a seminar on 32mm cabinetmaking methods, is the cost of the seminar tax-deductible? What about travel expenses for getting to and from the seminar? A woodworker can deduct seminar, education, and convention expenses from his income tax when they are incurred to maintain or improve the skills required in the business of woodworking. Travel expenses from attending educational activities such as seminars or a convention are deductible if the agenda is so related to the business of woodworking that attendance for business purposes is indicated.

Suppose you wanted to go to Japan for two months to learn how to make shoji screens from an old master. Your custom furniture business has had some requests for this item, plus you feel that to learn Japanese woodworking methods would improve your skills and help you get a better price for your work. You also want to bring your wife, who spends a couple of evenings a week doing your bookkeeping. Just what are the new tax laws regarding this expense?

Several points of tax law are involved in responding to this question. Travel expense deductions for a spouse require certain considerations. Special rules apply to foreign travel for business and pleasure. Normal requirements for deductibility of transportation and other travel costs of business and pleasure need to be scrutinized during the planning process.

Within the United States, transportation costs to and from the destination are deductible only if the trip is related primarily to your business. Even if the trip is mostly for pleasure, expenses at the destination that can be allocated to your business are still deductible, although expenses of getting to and from the destination would not be. If the trip is primarily for business, but you extend your stay for personal reasons, make side trips, or engage in other nonbusiness activities, you may deduct only the expenses, such as meals and lodging, that you *would have incurred if the trip had been totally for business.*

For *foreign* travel, however - even where travel is primarily for business - a portion of the expenses for transportation, meals, lodgings, etc. of the *business* part (as well as the pleasure part) is not deductible. The nondeductible part is computed on a time ratio, usually in the proportion of nonbusiness days to all travel days. This rule does not apply under the following five circumstances:

1. The taxpayer is an employee who isn't related to his employer and isn't a managing executive.
2. Travel is for one week or less.
3. Less than 25% of the time is spent in nonbusiness activity.
4. The individual traveling had no substantial control over the arranging of the trip.
5. A personal vacation was not a major consideration in making the trip.

Travel expenses for a spouse or other family member who accompanies the woodworker are not deductible on a business trip or convention unless the spouse's presence serves a bona fide business purpose. Incidental services such as typing notes, assisting in entertaining, etc., are not enough to permit the deduction. Where the spouse does accompany anyway, the deductible expense for transportation and lodging is the single rate cost of similar accommodations for the woodworker. The additional cost attributable to the presence of the spouse and the entire cost of the spouse's meals are not deductible.

Good planning and documentation of the *planning process* as well as the trip itself is obviously required to obtain the maximum deduction from a two-month business trip to Japan to study under an old master. Where the trip can be substantiated by the facts above and is carried out as a business trip to learn Japanese woodworking methods, full deductibility should result. The facts presented do not justify deduction of expenses for the wife, however.

To the extent that nonbusiness or pleasure time is added to the trip, the deductible amounts would be reduced as noted above. Note that intent and purpose with respect to business versus nonbusiness time is critical. Following a planned agenda of travel, meetings, instructional sessions, observation situations, etc. will greatly enhance justifying the deductibility of expenses incurred.

Documentary evidence, such as receipted bills and cancelled checks, are required to support all expenditures for lodging and for any other expenses of $25 or more. Documentary evidence is not required for transportation charges if it is not readily available. Otherwise, adequate records of expenses and uses of funds should consist of a currently maintained account book, diary, log, statement of expenses or similar record. Information reflected on a receipt need not be duplicated in an account book or other record if that record and the receipt complement each other in an orderly fashion.

As with any tax matter, consult your own personal tax advisor before making a final decision based on your own unique situation. **PW**

William L. Smith owns and operates a Comprehensive Business Services franchise in Tucson, AZ specializing in accounting, tax, and business consultation services to small business and self–employed professionals.

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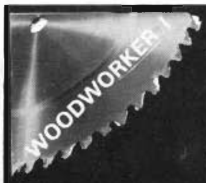

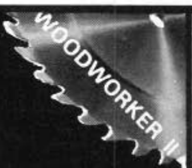

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Shop Health

by Dan Doty

A Subtler Injury

Woodworkers are subject to potential injuries daily, the more common being splinters and cuts on the fingers and hands. I have a few reminders of my own, for instance my left thumb isn't quite as long as my right one. However, I would like to discuss another potential injury that you might not be aware of, in particular the one I am suffering from as I write this–a painfully dislocated lower back. My doctor tells me it's the result of standing in an awkward, off-balance position for an extended period of time while working at my stationary belt sander.

My sander is the type where the belt runs horizontally and the operator must stand in front of it, slightly to the side, bending at the waist, and reaching forward. This is an awkward position. The problem is compounded by having to press down on the stock while pulling it toward you. I have stood in this position and sanded for 30 to 45 minutes at a time, sometimes longer. My doctor says these extended, non-stop sessions along with the extreme physical strain on the lower back has pulled away the hip bone (ilium) from the base of the spine (sacrum) area. It is in this area of the body where the most abuse is taken when the lower back is overworked.

It was a very subtle thing at first - showing up as a slight soreness in the lower pelvic area. The pain was nothing that a couple of aspirin and a good night's rest would take care of. Since then, I have had several "spells" with my back, about one per year. I would rest up, maybe make a trip to my doctor, take a couple of treatments, get better and then go back into the shop. My doctor tells me this type of back strain is accumulative, and after a while the injury may become permanent. The lower back is apt to give way under a lesser strain after each injury. This is when the most serious type of back injury can occur. Since the lower back can no longer provide the support needed, the pressure and strain points are automatically transferred to the next closest area, that being the vertebrae and disc area of the spine. The next time something heavy is lifted, a ruptured disc is a good possibility.

There are precautions to take that will either prevent this from happening, or in my case, reoccurring. 1)Don't perform tasks that put undue strain on the lower back for more than 10 minutes at a time. You should change what you are doing every so often. 2) Purchase a wide elasticized-cloth back brace, and wear it. This type of support has a Velcro™ fastener and can be stretched tightly around the lower back, giving support where it's needed. These back braces are very comfortable to wear, easy to put on over clothes, and take only a few seconds to remove. 3) Refrain from pressing down so hard; let the sanding belt do the work. This may require changing belts more often to obtain faster cutting. Another thing I believe will help is to use a coarser–grit belt first to cut the stock down more quickly, then change to a medium, then to a fine. This last suggestion will eliminate the need to press down so hard on a worn belt.

By changing a few work habits–especially shortening the amount of time you spend in one position doing one task–you can reduce fatigue and avoid a serious shop injury that is, believe me, quite painful. PW

Dan Doty makes dulcimers in Wychemere, Tennessee.

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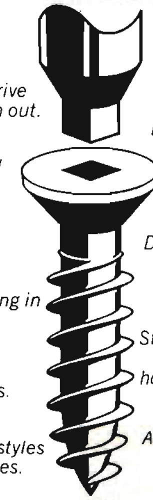
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Tried and True

by Graham Blackburn

Old Chisels

Confusion, ignorance, and prejudice exist in the tool market today. There is a rumor, not altogether unfounded, that almost any Japanese chisel is superior to almost any new Western chisel. In these days of mass production, meanness of design is synonymous with cheapness of quality. It's hard to deny the superiority of a tool with an exotic wood handle over one with a handle of mundane yellow or black plastic.

Opulence and magnificence of design have been taken as proof of a superior product. For this reason, those Japanese tools with the rare wood handles and fancy stampings and engravings are precisely those costly tools which are sought after by Western woodworkers who want the best available tool with which to practice their craft. What you may not know is that today's inexpensive–looking Western chisels are made to high specifications, the result of much technical know-how in metallurgy and manufacturing techniques.

Beyond that, however, there is another way to obtain extremely high–quality chisels which exhibit those pleasing designs like the Japanese tools for a fraction of the price and American made. It's a fairly safe bet that any Western tool of older vintage, if made with obvious pride and attention to detail, is a high quality tool. The wonder of it all is, that with the obvious demand for high-priced Japanese tools, a wealth of equally fine, older Western chisels lies ignored at the bottom of dusty, rusty piles of second-hand tools in junk shops and flea markets. True, many of these fine tools have lost their handles or sustained grievous damage to them; the blades have become covered with grime, rust and paint spatters; and the edges have long since turned into thicknesses too fat for screwdrivers or even paint can openers. But to the learned eye, a treasure trove lies at our feet.

Restored to their original condition, these tools are every bit as fine as a new boxed set and answer Western needs more closely than tools designed for another tradition. To understand why, let's take a closer look at the varieties which exist – for these older chisels were made in an almost bewildering array of forms for many different and specific purposes.

Types of Chisels

Beginning with general forms (which is usually all that can be discerned when you start looking in piles of old tools) we'll examine the main types. First, all chisels are either socket chisels or tang

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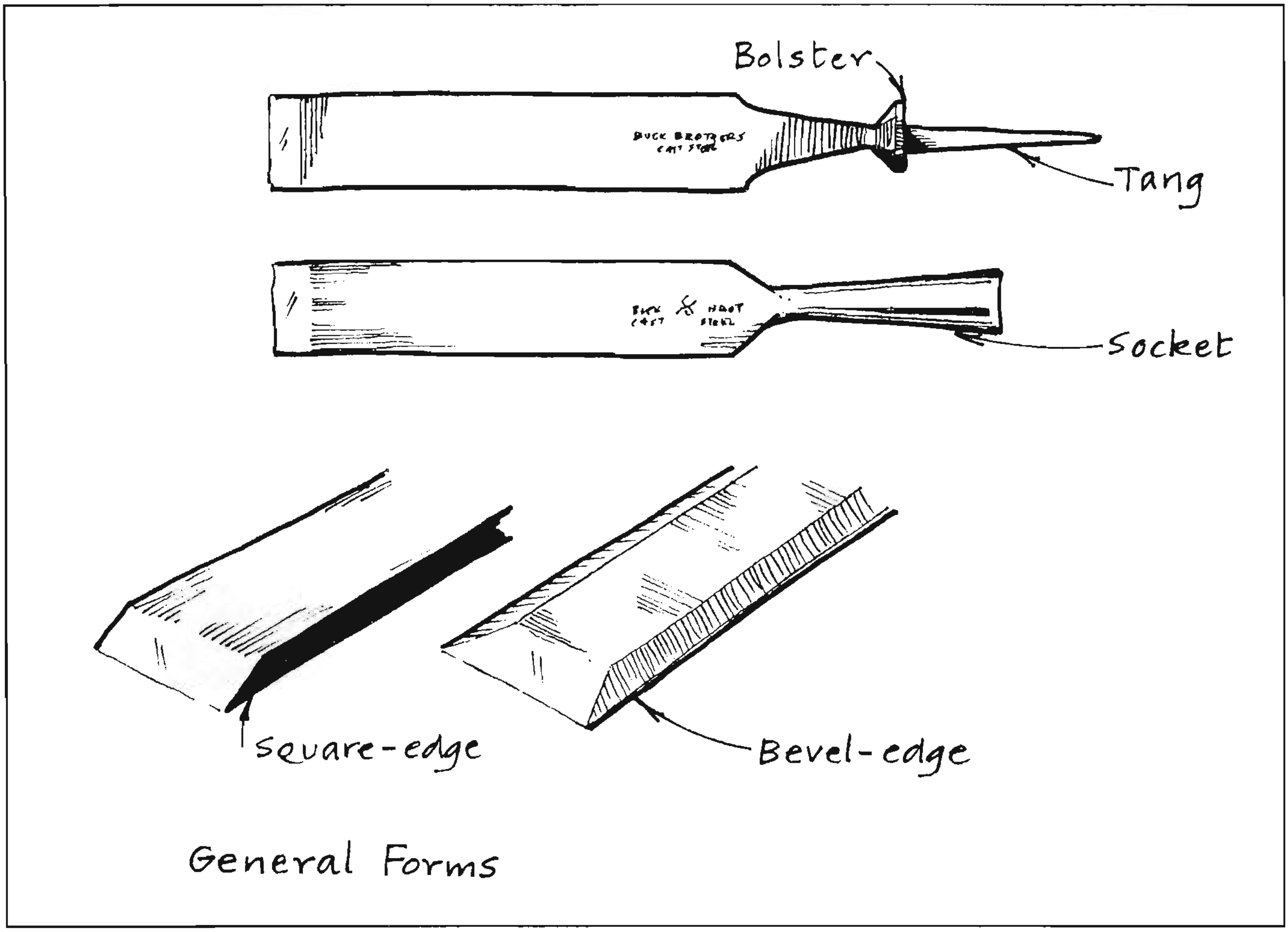
***Graham Blackburn** is a furniture designer/ maker in Soquel, California and the author of many books on woodworking and home maintenance including* Floors, Walls and Ceilings *which is to be published this fall by Consumer's Union.*

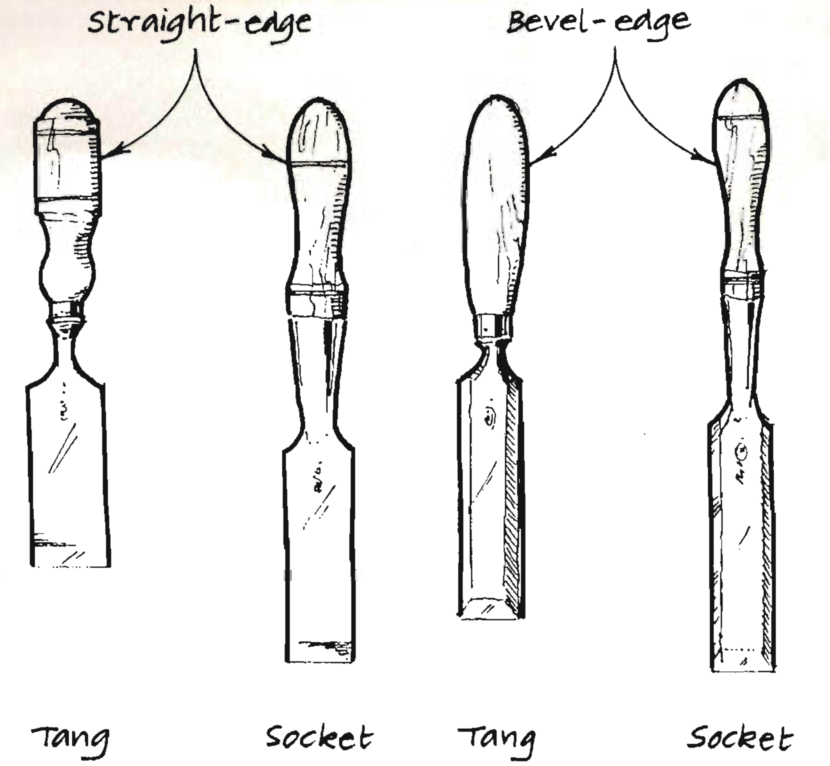


General Forms

illustrations by the author

chisels; furthermore, all chisels, whether socket or tang, are either flat–edged or bevel–edged. Tang chisels of both types, and bevel-edged socket chisels, are intended for delicate work. Designed to be used with the power of the hand alone, the blades are thinner and better suited for light, paring cuts.

Socket chisels are built to accommodate the use of auxiliary force, such as mallet blows. The socket is designed to function as a strong ferrule, lending support to the bottom of the handle which, being made of wood, could not withstand repeated heavy blows from a mallet. For this reason the upper end of the handle is frequently provided with a leather or metal shock–absorbing ring. Without these rings the handles would inevitably splay out like an old toothbrush.

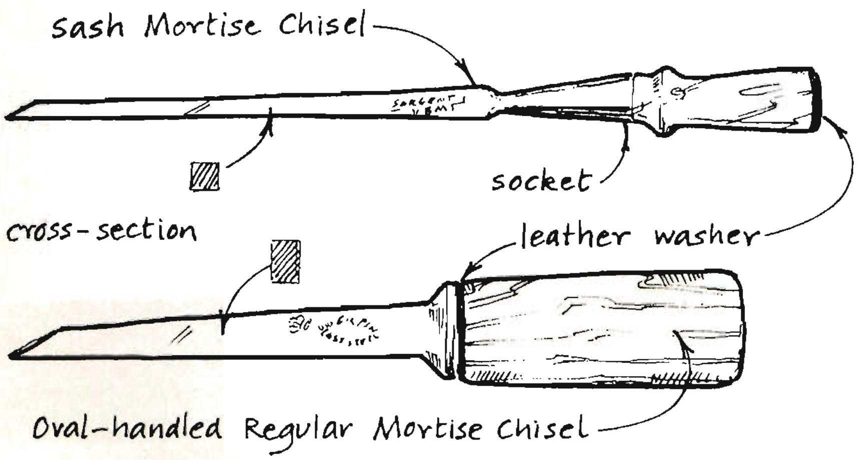


The Four Main Combinations of Paring and Firmer Chisels

illustrations by the author

Mortise Chisels

An interesting exception to the above rule exists with mortise chisels. Those mortise chisels that are smaller in cross-section and designed for light work are generally longer (size for size) than their cousins with larger cross–sections and are always made with sockets, whereas their larger cousins are tanged. These smaller chisels are called sash mortise chisels. Mortises in sash work are generally smaller than those cut in heavier door frames and other joiner's work, hence the smaller cross–section. Their very slightness, coupled with the extra length, necessitates a socket to prevent their correspondingly narrow handle from splitting out if any leverage is exerted on the tool. Regular mortise chisels are furnished with much stouter handles, frequently of very strong wood such as oak, and have only to withstand the shock of being pounded on the end. The older style is surprisingly comfortable to use when compared to any contemporary mortise chisel. The oval handle also aids considerably in keeping the tool aligned properly when first delineating the mortise.



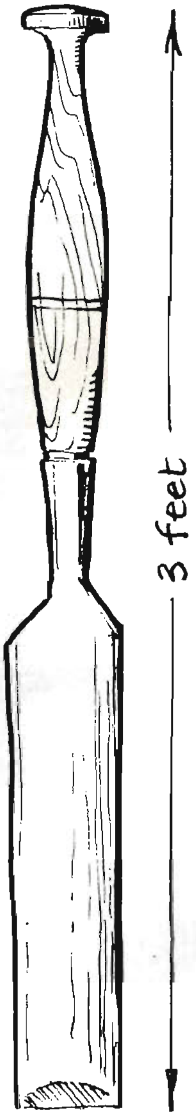
Mortise Chisels

Another difference between old mortise chisels and contemporary ones is in the thickness of the blade. Modern tools tend to have blade cross–sections that are almost square; older mortise chisels have a blade that is much deeper than it is wide, providing the tool with far greater strength.

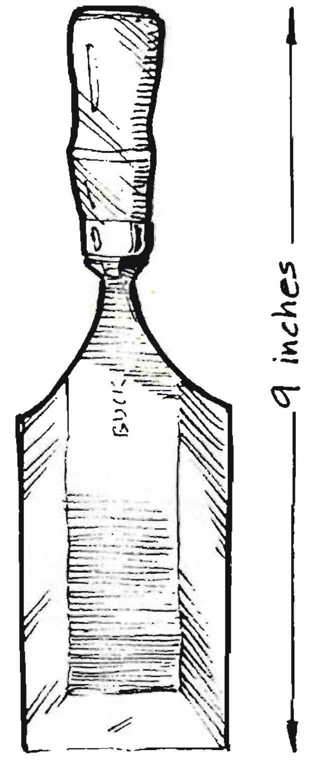
The very largest of the mortise chisels – those intended for use on heavy timber framing (and thus made as socket chisels) are designed to clean up the corners of large mortises and are usually distinguished by the stout metal rings or hoops fitted to the end of the handle. This is usually called, obviously enough, a corner chisel. It was also referred to as a bruzz, especially when used as a cooper's tool, although it's essentially the same item.

Firmer, Paring and Framing Chisels

The three largest groups of chisels are those known as firmer, paring, and framing chisels. The first two groups, firmers and parers, can be found in four varieties each: straight–edged and bevel–edged tang; and straight–edged and bevel–edged socket. Framing chisels are all made with sockets and are invariably straight–sided, since they are not designed for bench work but for heavy work by carpenters and joiners. They exist in a surprising variety of shapes, widths, and sizes. Larger framing chisels have flat backs but gently rounded faces, which make the tool much stronger without drastically increasing the size.



Carpenter's Slick



Butt Chisel

It's sometimes hard to tell exactly what type of chisel you're looking at when rooting about in a junkpile at a flea market, but a little comparison will soon show you the differences. Firmers are the basic, all–purpose bench chisel and are thicker than paring chisels. Not that it may be of much help when looking at an old and long–abused tool, but when properly ground, the bevel on a paring chisel is much flatter than on a firmer. The paring chisel, being the more delicate tool, will have seen less arduous service and therefore will have been ground less frequently and so have kept more of its original length. Firmers, on the other hand, are often found in quite short lengths.

Exciting Finds

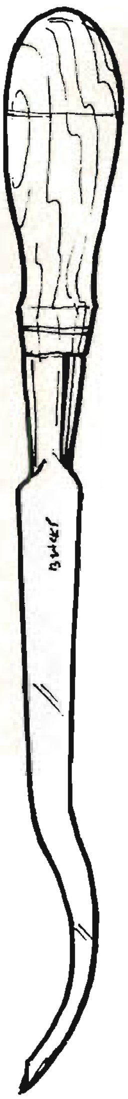
Although an attempt to equip yourself with a working (though not necessarily matched) set of straight–edge firmer chisels and tang paring chisels might constitute a collection of 20 or more tools, it's also possible to collect at least that number again in more specialized, odd chisels.

Butt, or pocket chisels, used for fitting in butt hinges when hanging doors, are particularly useful because of their larger than usual width combined with their handy shortness. They range from 1-1/4" to 2-1/2" wide and are generally no longer than 9" overall, including the handle.

Especially large framing–type chisels, known as carpenter's slicks, are still to be found. If the handle is still with the tool, you will notice that it ends in a large mushroom designed to rest comfortably in the hollow below your shoulder. These tools are very long and require the weight of the whole body to use them – even though their purpose is that of a giant paring chisel, designed to take very light cuts.

Should you stumble across chisels that have all the attributes of bevel–edge paring chisels yet seem unaccountably long, you will have found patternmaker's paring chisels. These are probably the aristocrats of the bench chisels, and are unsurpassed for delicate operations such as paring sockets for sliding dovetails and other jobs where a far–reaching, but thin, chisel is needed. An even more fortuitous find would be crank–necked patternmaker's paring chisels which allow the back of the blade to lie flat on the work without interference from the handle. These turn up mainly in sets at tool auctions, but are nevertheless worth the price when the quality and workmanship are compared to the poor contemporary imitations.

Extra–large, flat, firmer chisels are the kind of thing that surface in barn sales from time to time. If you were lucky



Lock Mortise Chisel

enough to find one with an octagonal and turned boxwood handle, you would know for certain that you had found a superior tool.

Less rare, and perhaps in this day of plunge routers less useful, are lock mortise chisels. These monsters, which actually come in a wide range of sizes, are hook–shaped to clean out the bottoms of deep but relatively thin mortises such as used to be cut for door locks on houses.

The list could be continued almost indefinitely, including things like deck chisels, floor chisels, watchmakers chisels, etc. Once started, your collection would grow in perpetuity towards that infinite state of completion often imagined but never realized.

Quality or Junk?

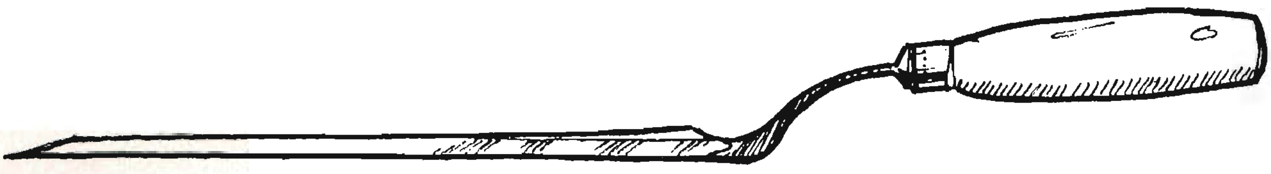
The more use and abuse the tool has suffered, the harder it is to determine quality. But by the same token, the worse the condition in which the tool is found, the smaller the risk simply because its price will be lower. If you discover old chisels in antique shops or shows, don't expect to see low prices. In these cases, the seller has frequently attempted some refurbishing and assumes that a coat of something shiny, especially when the tool possesses a polished brass ferrule, automatically confers worth as an "antique." Unless or until you become familiar with reputable brand names and the marks of the brands which produced lesser–quality tools, avoid paying very much for these items.

Should the chisel be lucky enough to retain its handle, you can infer much about its potential quality. A handle with leather rings indicates a firmer or a framing chisel – there is no need for rings on a delicate paring tool. A nicely turned handle with beads, rings, coves or other decoration is a sign of quality even if that handle is in lamentable and unusable shape. The tool may be good; the handle can be replaced. Of course, just as you might replace the handle, so might some previous owner have replaced it, though it is not too likely that an inferior chisel would have been rehandled with a quality handle.

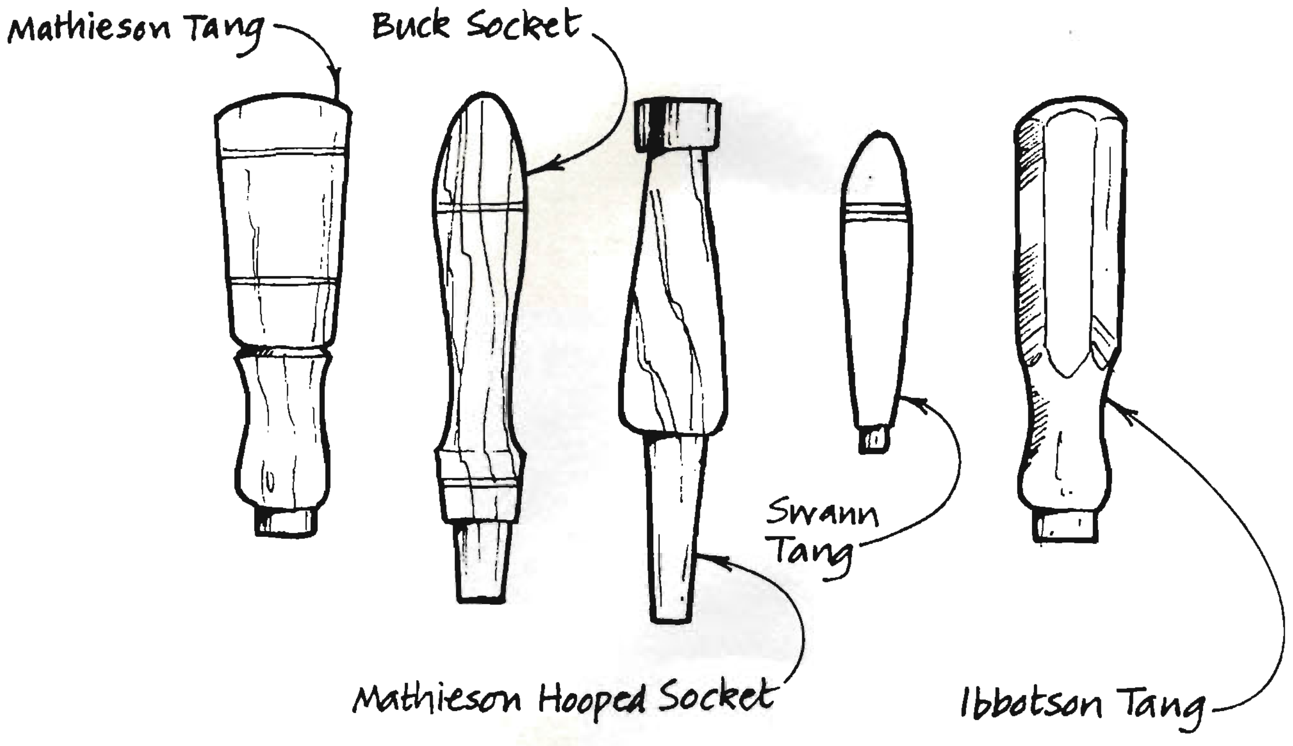
Different makers used distinctive handles. Once you start to recognize certain shapes as those used by particular makers, you can take a chance that the tool is by that manufacturer – even though you may be unable to read any stamp on the face of the blade. A look at the stamp (though sometimes because of severe use or a poor impression during manufacture, only part of a stamp is all that is visible) is often all it takes to recognize a worthy find.

Socket chisels are those which suffer the most abuse. When a handle is lost or destroyed, the sockets offer themselves up for sacrificial beating around the rim of the sockets, usually with hammers instead of wood mallets. A handleless tang chisel usually has the end of the tang bent over like a hook, but this is easy to straighten and of no importance.

Spend some time examining whatever is visible of the actual metal. Beaten sock-



Crank-necked Patternmakers Paring Chisel



Various Distinctive Handles

ets can sometimes be saved if they are not misshaped too much. Beware the split socket. Likewise avoid chisels with cracks or serious deformities. Rust is only a problem when it has pitted the back of the blade to such an extent that perfect flattening would either take too long or render the tool too thin for safety. Paint and grime are of no importance; the steel can usually be polished to whatever degree of lustre you prefer. Initial reshaping on the grindstone – carefully done so the temper isn't drawn – will reveal the fact that most older old chisels (from before the turn of the century) were made with laminated blades. This is very good since it indicates a superior cutting edge. If the tool is not too dirty in the first place, you may be able to see the lamination at the back near the top of the blade, for this is where it ends, and the different colors of the two metals are often discernible.

The shortness of the blade can mean different things: either the quality of the steel was so poor that repeated sharpening was needed, or the quality was so superior that the tool was cherished and used for a very long time rather than being laid aside for a newer tool. I'm inclined to take the latter view because I don't think anyone would bother with a tool that needs such frequent resharpening; they would have abandoned it. If extensive regrinding is evident, it's possible to retemper a blade, and this may well be worth the effort if you see it is of the laminated type.

One last word about handles, of which the variety is even greater than the tools themselves. Many will be missing, many more will be split and pummeled into uselessness, and frequently you will find a tool that obviously has the wrong handle attached. While the handle (or lack of it) should never be the deciding factor in considering a chisel's potential usefulness, they are deserving of attention in their own right. It's often hard to tell under the grime that accumulates with the years, but they come in a variety of woods, some very special. Handles nowadays, when they are still made of wood at all, are generally of hickory, ash, or maple. Only the better tools, usually European imports, are still made of boxwood – and it is generally a poor, flawed kind of boxwood at that. Older tools had handles of many woods, including apple, cherry, rosewood, beech, and really fine, close-grained boxwood.

The designs are endless and some of the turnings employed were truly sublime. Other handles were faceted and combined with turnings. Enclosing the bottom end of many handles are often nicely chased brass ferrules which, if they have become loose, may be tightened again with the judicious use of a center punch. All in all, it is a fine feeling to hold a tool with a beautiful handle and know that you are continuing a worthy tradition. PW

A Popular Woodworking Project

Two Boxes for Allison

by John Sainsbury

A present for Allison (since she's rather a gem) suggested a lathe-turned jewelry box from something exotic, with perhaps a touch of silver thrown in. I decided on two boxes, both to be made from the same block of grande palisander (Mexican rosewood).

Now, I'm not a mean man, just careful with wood - especially exotic timbers which are so expensive. Since I couldn't bear the thought of having so much of the palisander land in shavings on the floor, I decided to turn the project into an exercise in frugality to see how much of the wood could be saved and put to use.

My first consideration was to attach the faceplate without making screw holes in a portion of the wood that would have to be cut off later. I used a method which I call the glue chuck. This merely consists of a piece of plywood attached to a faceplate or a screwchuck. To the face of this piece smear a thin film of glue from an electric glue gun, center the block to this, and squeeze it in the vise for a moment or two. This method will be found extremely useful for all manner of holding problems. The finished work is easy to remove by using a thin knife and tapping with a hammer. The glue chuck can also be used over and over again by remelting the glue with a hot air gun (or your wife's hairdryer - but don't tell her I said so if she catches you).

With the block mounted and all systems go, turn down to round with a gouge and a skew chisel. Before commencing to turn the lid, I used a parting tool to make two cuts - one from the side and one from the end - to cut a ring-shaped piece, thus saving the circle of timber around the knob. Turn the knob with gouge and chisel, and bring it to a finish before cutting an exact-sized recess in which to inlay the silver disk.

To separate the lid from the box, use the parting tool to cut a shallow groove. Then part the lid just below the groove to form a rebate in the lid.

With the lid removed, the next step is to cut out the piece that will become the second box. To do this, install a drill chuck into the tailstock and use a 1-1/2" plug cutter. Mark the depth to be bored on the side of the cutter with a piece of tape. Reduce the speed to about 450 RPM, and advance the cutter slowly. Be careful here since it hasn't a center point to guide it. Then, when fully cutting, move it forward fairly quickly to avoid any possibility of burning. Remove the plug by giving it a sharp tap with a piece of wood and a mallet.

At the same speed of 450 RPM, use a thin parting tool to cut a groove in from the end that is quite close to the full diameter of the inside of the box. This will leave a cylinder of wood which can be finally separated from the body by using

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***John Sainsbury** is the founder of the Studio for Woodcraft where he teaches students from around the world. Among his many books are* Planecraft - A Woodworker's Handbook *and* Woodworking Projects With Power Tools *(Sterling Publishing Co.)*

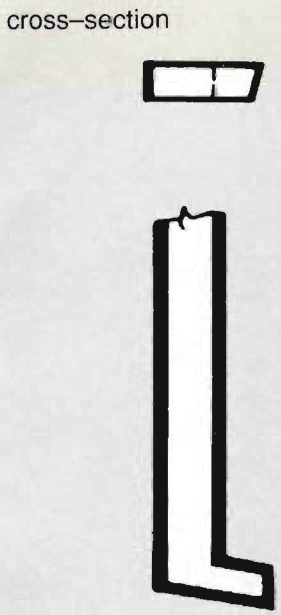

Figure 1
The author's side–cutting parting tool

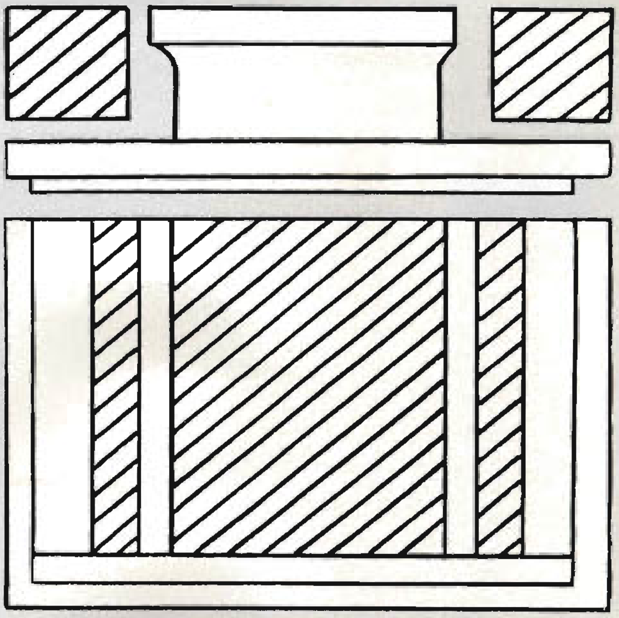

Figure 2
The shaded areas indicate the saved wood.

a small side-cutting parting tool which I made from a piece of tempered steel (see Figure 1). A spade scraper can be used to trim out the inside of the box - it will be difficult to use the conventional gouge here since most of the timber has already been cut away.

Finish the inside with sandpaper and polish it with shavings (unless the box is to be lined with a suitable material, in which case a slightly less smooth surface will give added grip for the glue). Insert the lid and trim up, if necessary, then clean and polish.

The small box can be made the same way the large one was by holding the saved plug on the glue chuck and cutting with the gouge and parting tool. If you like, you could leave it in the center and turn it in situ. You won't be able to save the wood around it, but then not everyone is a miserable Welshman like me. The box body can also be cut using a multispur or Forstner bit instead of the gouge or spade scraper.

Since I did save the wood, I was left with a large ring (from the lid) that was 3" in diameter, and 1/2" thick with a 2-1/4" hole in the center, two smaller rings (from the cylinder that was cut from around the small box) that were roughly 2" in diameter with walls that were 1/8" thick and 1/2" high, and a 1-1/2" ring that was parted from the small box. From the large ring I made a picture frame by mounting it on a mandrel to do some additional turning. To do this, mount a block of softwood that is 2-1/2" in diameter on a faceplate or a screwchuck with a piece of hardboard or plywood between the timber and the face of the chuck to protect the tools and the chuck when cutting. Turn this mandrel down to a diameter of 2-1/8" at the front, with a very slight taper from front to back. Slide on the large ring so that it is gripped firmly. Check for squareness, then use a gouge to face and true up the edge, then the parting tool to cut a 5/16" rebate on the inside edge. This will be the back of the frame. The recess should be deep enough to hold the glass, picture and backing material. Remove it from the mandrel, and replace it in reverse. Check for security and perfection of setting, then use the gouge to shape the picture frame to suit.

I made the two smaller rings into pin strays with the addition of two small pieces of 1/8" scrap picked from the trash box. Use the hot–melt glue gun and squeeze a very tiny amount of glue across the face of the mandrel. Work quickly, bringing up the tailstock to assist in pushing the disk hard onto the mandrel. Leave it for a moment. Then, using a tiny gouge, turn the piece down to the exact diameter to fit into the small rings. Use ordinary glue to attach a ring to the disk. When it's dry, finish the piece on the lathe.

The small ring made another nice picture frame, so now Allison has her two boxes, some dressing table accessories and some frames for photos of her favorite frugal woodturner. PW

From the wood the author saved while cutting the two boxes, he made two pin trays and two picture frames.

photos and illustrations by the author

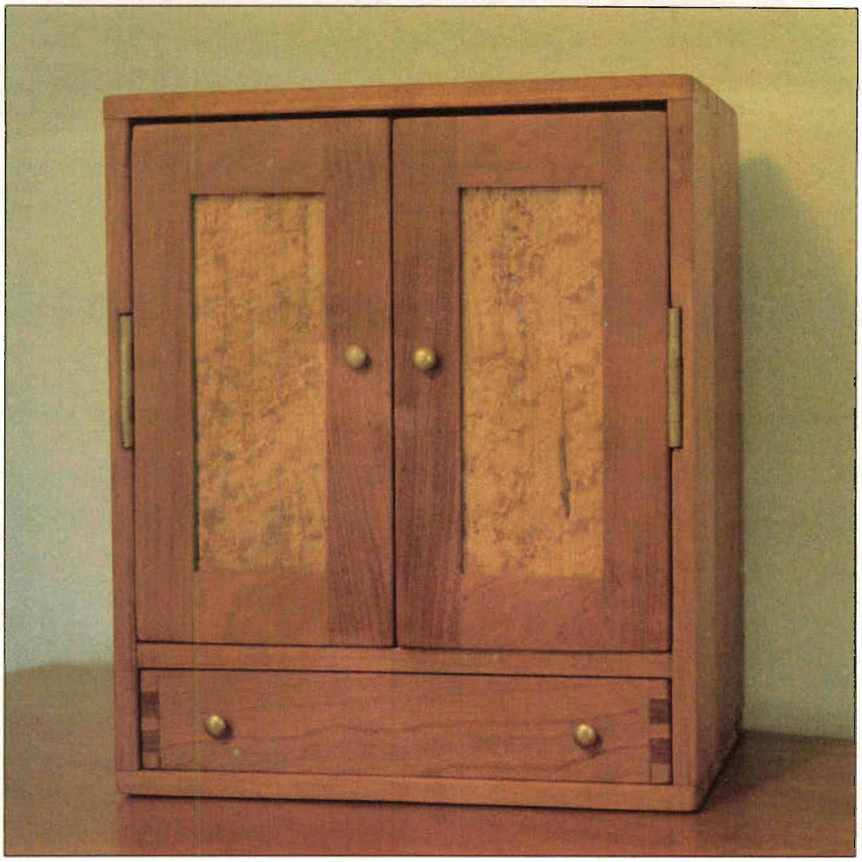

photo by the author

Making a Jewelry Chest

by Hugh Foster

This jewelry chest is an interesting project because it offers you an opportunity to do delicate work in fine wood without spending an arm and a leg. Most of the stock for this project is so thin it can be resawn from standard sizes, and that will vastly reduce your cost. I have made these chests of cherry, cherry with bird's-eye maple panels in the doors, pecan, pecan with walnut panels, and walnut with rosewood panels.

I originally started out making one as a Christmas present for my bride; instead of the dovetails featured here, I used mitered joints on the carcase and rabbets for the drawer joints. It was much finer looking than the cardboard and plastic model I was copying, and may suggest how to modify this plan to simplify the project. I ran a batch of three, figuring that the extras might sell. I sold all three for something in the neighborhood of $250, and my bride got her present some months after Christmas passed. Making a batch of three or four of these will take scarcely twice as long as making just one, even though the dovetailing is all detailed handwork. Besides, after you have made a short run of these, you will hand–cut dovetails both more quickly and more accurately, and that alone may be sufficient reason to try this project.

The first step in the project is making the carcase. Don't make the interior pieces or the back until you complete the carcase routing and assembly because slight errors here can be overcome by altering the later steps of the project.

Cut the bottom and top (A), and two sides (B) to size. Lay out your dovetails in an interesting pattern. They should be quite fine or else the piece will look clumsy and machined. Mark the pins in the top and bottom (A), cut them with a fine saw, and chop out the waste (as described in *Popular Woodworking*, Issue #38). Use these pieces to lay out the corresponding tails on the sides (B).

Once the pieces fit together smoothly, take them apart and mark out the drawer positions on the sides. Carefully rout matching dadoes for the drawer supports (C and D) and shelf (E). I used a 1/2" wide × 1/4" deep dado for the shelf that divides the visible drawer from the hidden drawers, and a 3/8" × 1/4" deep dado for the drawer dividers in the upper unit. The drawer support dadoes should stop 1-1/4" from the front edge. The dado for the shelf stops 1/2" from the front and the shelf should be notched accordingly. It is imperative that these dadoes be cut exactly across from one another; if they aren't, the drawers won't fit squarely in their openings. The spacing for the drawers is largely a question of personal choice, but my design features an exposed drawer that is 2" high, two interior drawers 2" high, and three interior

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Hugh Foster is a part-time furniture designer/builder in Manitowoc, Wisconsin.

Jewelry Chest

Cutting List

Qty.	Part	Finished Size			Piece
		T	W	L	
2	A	1/2"	8 1/4"	11 1/4"	top & bottom
2	B	1/2"	8 1/4"	13 1/2"	sides
4	C	3/8"	1"	10 3/4"	front drawer supports
8	D	3/8"	1"	5 3/4"	side drawer supports
1	E	1/2"	8"	10 3/4"	shelf
1	F	1/4"	10 3/4"	13"	back
6	G	3/8"	*1 1/2"	*10 1/8"	top 3 drawer fronts & backs
6	H	3/8"	*2"	*10 1/8"	bottom 3 drawer front & backs
6	I	3/8"	*1 1/2"	*6 3/4"	top 3 drawer sides
4	J	3/8"	*2"	*6 3/4"	middle 2 drawer sides
2	K	3/8"	*2"	*8"	bottom drawer sides
5	L	1/8"	6 1/4"	9 5/8"	top drawer bottoms
1	M	1/8"	7 1/2"	9 5/8"	bottom drawer bottoms
4	N	5/8"	1 1/2"	4 7/8"	door rails
4	O	5/8"	1 1/4"	10"	door stiles
2	P	1/4"	4 3/4"	8 1/2"	door panels

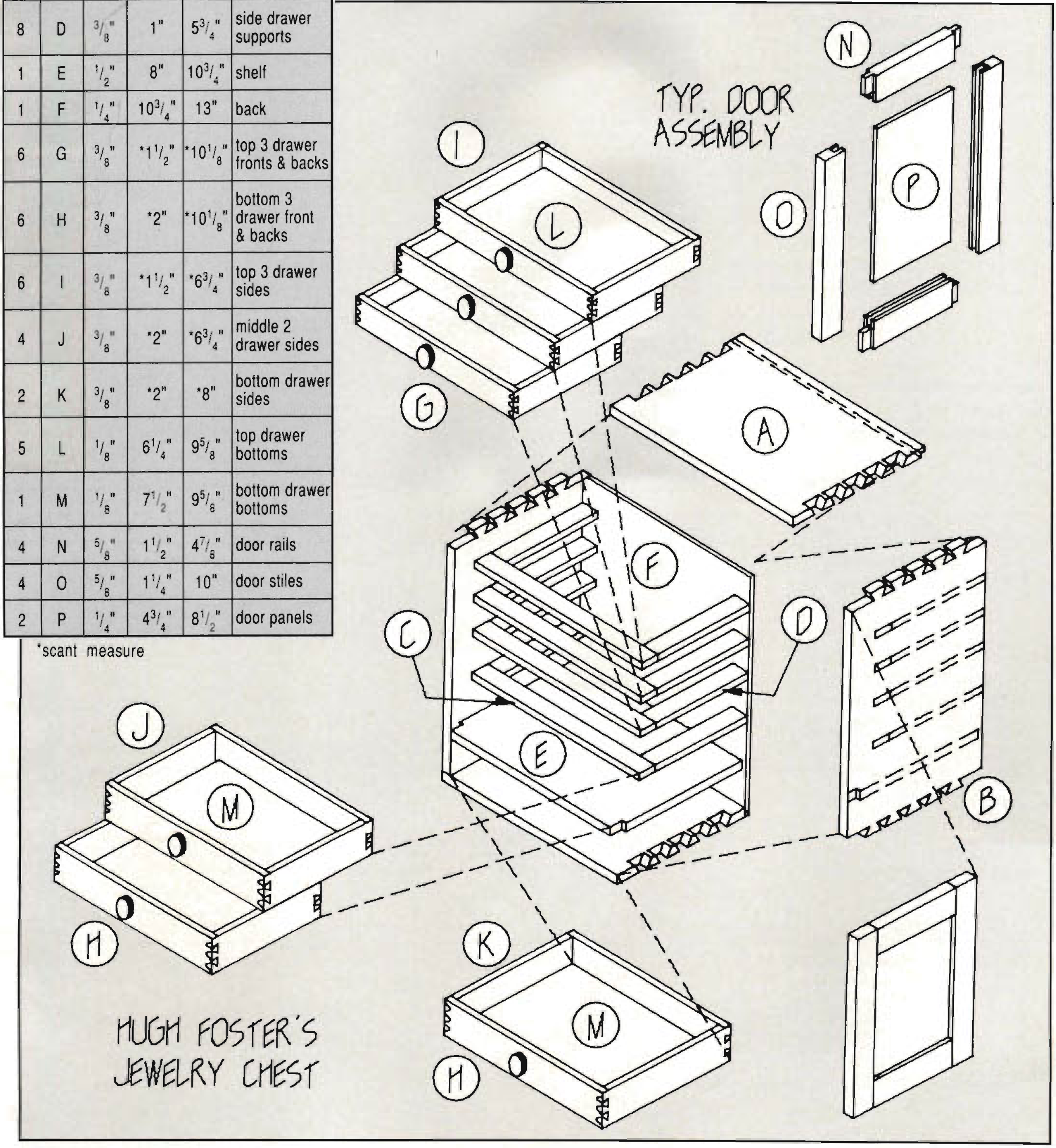
*scant measure

drawers 1-1/2" high. Rout your stopped dadoes accordingly, and square their "fronts" with an appropriate chisel.

Next, put the carcase back together and rout a 1/4" square rabbet all around the inside back edges and square the corners with a chisel. This rabbet is to accept the back (F).

Assemble and glue the carcase with the shelf in place, but leave the back off, for now. Install the front drawer supports (C) by sliding them in place. Put some glue on the ends and on one edge of the side support pieces (D), and fit them just behind the front supports in the routed dadoes. Now install the back (F).

Next comes the making of the drawers. First measure your openings. If they correspond to the cutting list, cut all the needed fronts and backs (G and H) and sides (I, J and K) to size. Dovetail them together with through dovetails. Cut a

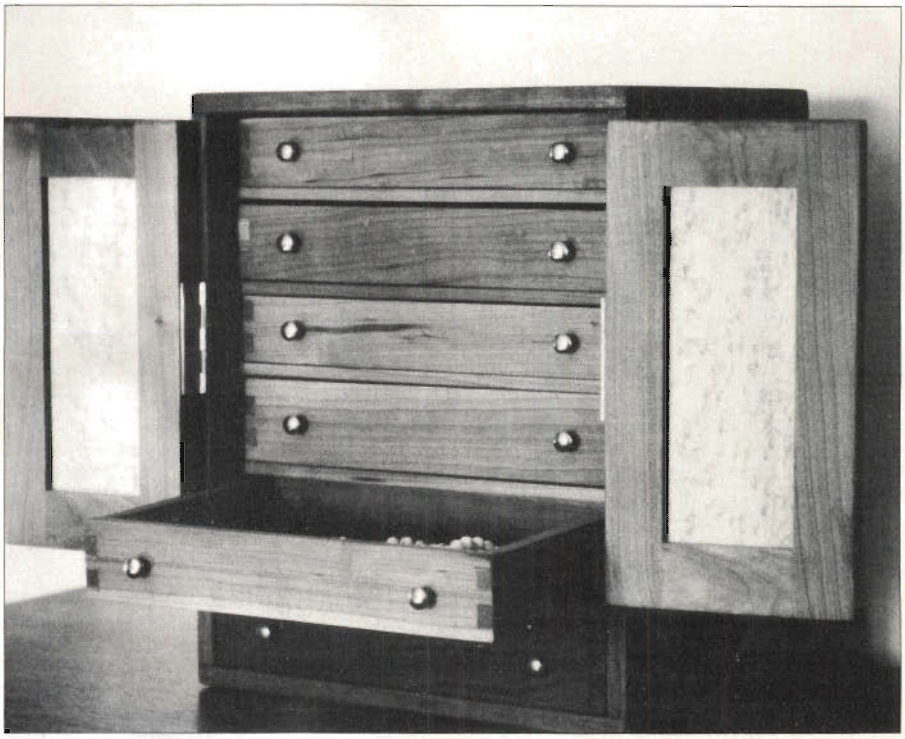


1/8" wide × 1/4" deep groove along the inside bottom edge of the sides. Mount the bottom panels (L and M) in this groove. After you have cleaned up all the joints and smoothed the drawers, check them for fit. Be sure as you cut the drawer parts from the cutting list that you use only scant measure; if you cut each piece to absolutely full–length and width, the drawers will be too tight to fit into the carcase. Be prepared to touch a plane to the drawers in any event.

Making the doors is much easier than making the drawers. Cut the rails (N) and stiles (O) from 5/8" stock. Cut a 1/4" wide × 1/2" deep groove down the center of the inside edge of each strip, and cut 1/2" long tenons on the ends of the rails to fit neatly into the groove in the stiles. Cut your panels (P) to fit, less 1/8" to 1/4" in width to allow for panel expansion. My panels are flat, but yours could just as easily be raised; I chose flat in order to maintain a certain simplicity of design. Assemble the frames and panels carefully, and glue them without getting any glue on the panels. Clean up the doors and mount them with small solid brass hinges and very short screws.

It's a good idea to put a set of short legs under each jewelry box. Screw-on rubber bumpers are perfect for this.

I finished each jewelry box with either Watco® Oil or Minwax® Antique Oil. Smooth the whole project through 220 grit, and apply two or more coats of finish to the outsides of the chest only. The insides receive a couple of coats of lemon oil and the outsides of the drawers and the insides of the chest were rubbed with stick paraffin. This is sufficient finish to protect the inside. I always complete my finishing schedule with an application of Goddard's® Cabinetmaker's Wax and deliver the rest of the can with the project, instructing the owner to take good care of the project by waxing it frequently.



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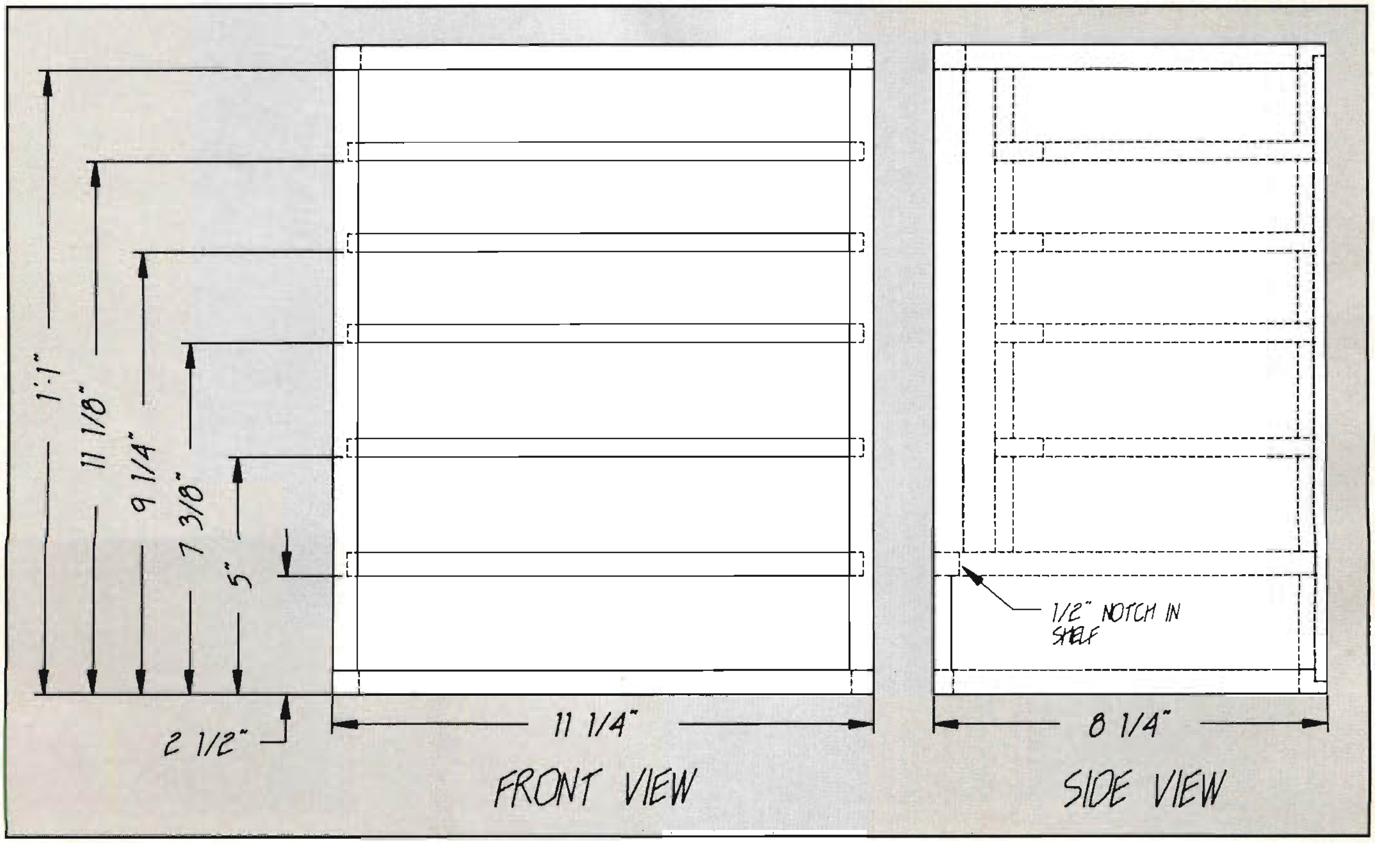


illustrations by Jim Van Beveren

Woodworking Basics

How To Make The "Basic Table"

by Kingsley Hammett

An old–timer once told me that when he was a young man, his desire for quality furniture outstripped his ability to pay for it, so he built his own. It was the same lack of funds that got me started making tables. Since my first effort, which was bolted together and made without any shop equipment, I've developed a system that can generate any table for any specific use. I've made dining room tables, kitchen tables, coffee tables, tables to hold plants, tables to hold books, tables to serve just about any purpose at all.

No matter what the purpose, no matter the size, the "basic table" consists of the same three basic parts: a top, rails, and a set of legs. A table properly designed for sitting should measure 29" high. A nice dining room table measures about 30" to 32" wide by 60" long; a kitchen table can be in the neighborhood of 30" × 48", depending upon the space available. A coffee table is about 17" high and as wide and long as you like. Here is how I build a standard dining room table.

Depending on the width of the boards and the desired width of the table, take five or six squared-up boards and mark their edges for dowel locations to make up a panel for the top. To do this, stack them on top of one another, and with a combination square, strike a line across all edges simultaneously. Dowels should be located close to the ends and 12" to 14" apart. With the help of a doweling jig, drill a 3/8" hole in the center of each board at every mark (with the exception of the two edges that will be the outside edges). Pour a little glue down the sides of the holes and tap a 3/8" gluing dowel into the holes along one edge of each board. Run a bead of glue down the edge of each board, line up the pegs with the empty holes, and clamp the whole thing together, making sure it's all flush and flat. Take it out of the clamps the next day, clean up the glue lines, and you have a finished top.

If you want to make the top appear thicker without actually doubling its thickness, an alternative is to rip some stock into 4" strips and glue and clamp them under the edges of the top. Sand down the edges; you'll get an interesting combination of end grains at the corners, and the table will appear as though it's two boards thick.

The next step is to cut four legs from solid or laminated stock, finished to 2-1/2" square (since this is the maximum width most doweling jigs can accept). If you want larger legs, the rails and legs can be assembled with a mortise and tenon joint. Sand them smooth. Carve a design down the face if desired, and if you like, knock off the edges with a router or plane. Finally, cut them to length so that, together with the top, the table will stand 29 inches off the floor.

A comfortable arrangement has about 10" between the underside of the table and the top of the chair seat. Therefore, the rails should be limited to no more than 5" wide. I make most of mine about 3" to 4" wide. The drawing on page 31 gives one alternative design for an interesting rail

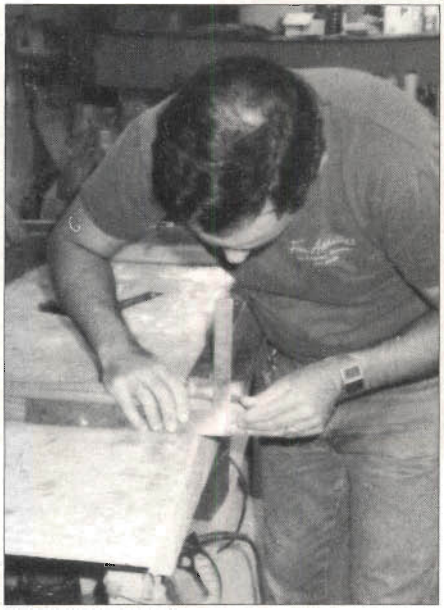
***Kingsley Hammett** is a licensed general contractor in New Mexico. He is currently focusing on custom furniture construction and residential and commercial remodeling.*

Mark where the leg face meets rail end grain with letter "A," and continue around table through letter "H."

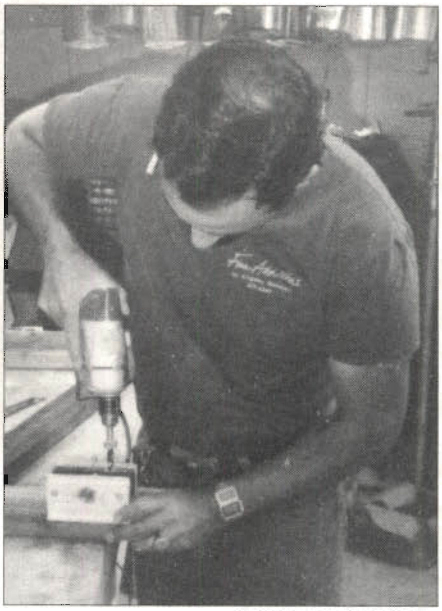
photos by the author

adapted from a country kitchen table I saw somewhere in a magazine.

I like the legs to sit about 1" in from the outer edge of the table. So, if the table is to be 30" wide and the overhang takes up 2" and the two legs take another 5", the end rail should measure 23". By the same token, the two side rails would measure 53" (60 minus 7). These measurements are for doweling the rails to the legs; if you're using mortise and tenon joinery (see *PW* #30, April/May 1986), you'll need to add on the length of the tenons.



Place a rail on top of a leg; strike two lines through both to mark where dowel holes will be drilled.



Drill 3/8" holes at the marks on the rails and legs.

Place the tabletop upside down on a pair of sawhorses and set up the legs and rails as they will sit when assembled. Starting at one corner, mark the leg and the end grain face of the rail it will join with the letter "A" and so forth as you move around the table, until the final face of the first leg meets the final rail face at letter "H."

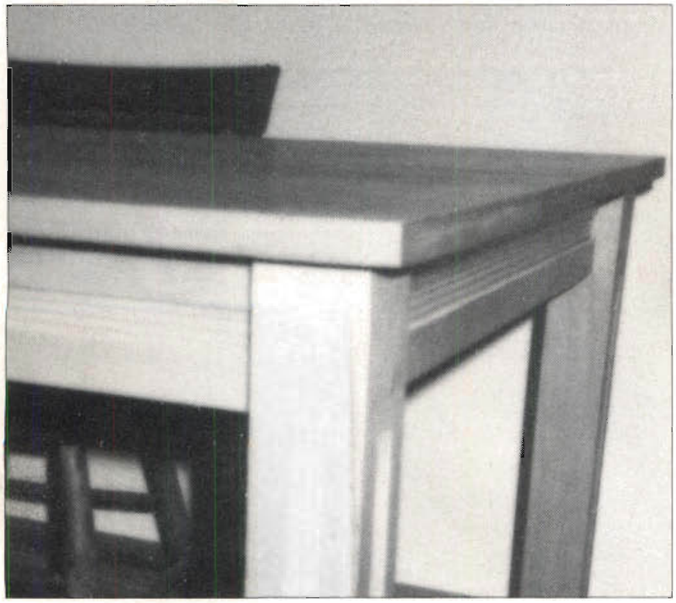
To dowel the leg–and–rail assembly, lay one leg down flat on the table and lay the rail it will join flat upon it. Make sure the rail is absolutely flush with the top of the leg where the two will meet at the underside of the table. Also make sure the rail is square with the leg.

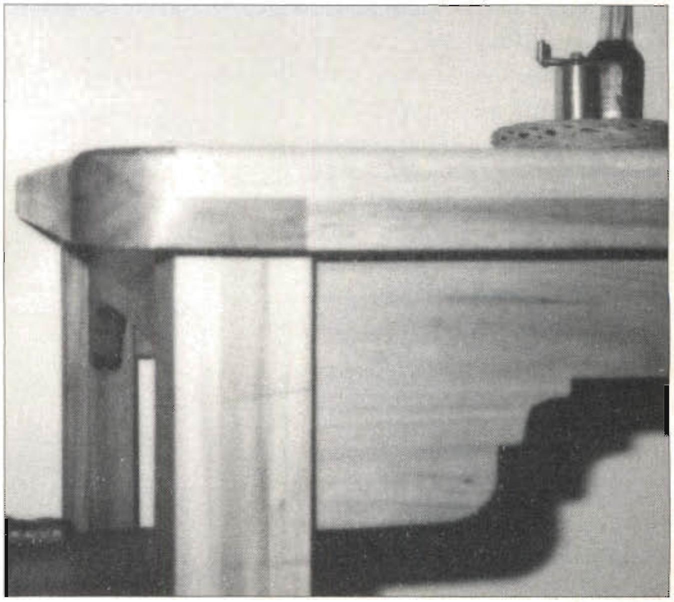
With a square, strike two lines across the end grain of the rail and the face of the leg about 2" to 3" apart. Decide if you want the rails flush to the outside edges of the legs, or slightly offset, and mark a centerline for the dowels accordingly. Do this marking for all eight places where the faces of the legs meet the end grain faces of the rails. Take the doweling jig again, and drill 3/8" holes at these marks. Put glue in the holes and on the end of the rail. Insert the dowels, tap the entire framework together, and clamp it overnight. Make sure the legs are square to the rails and parallel to each other, and make any adjustments now, while the glue is still wet.

Now the leg–and–rail frame is ready to be fastened to the top. Cut some 3/4" square strips and glue and screw them to the top inside edge of the rails. To allow for wood movement in the tabletop, make the holes in the cleat oblong in the direction perpendicular to the top's grain. Then screw through the cleat and into the underside of the tabletop without using any glue. This way the screws can "float" in their slots as the top expands and contracts.

Tables, whatever their intended use, get dinged and scratched and develop their own personality over time. To me, that's as it should be, so the only finish I use is a natural oil called Livos imported from West Germany (Woodpecker Tools, Santa Fe, NM). It's non-toxic and it brings out the best natural color of the wood which gives the table a simple finish that's continually enhanced by everyday spills and cleaning. PW

There is an infinite number of ways to decorate the legs and rails of tables. Below left, a moulding head was used to run a detail down the center. Below right, the rails were profiled on a band saw (note also the boards added to the underside to make the top appear thicker).





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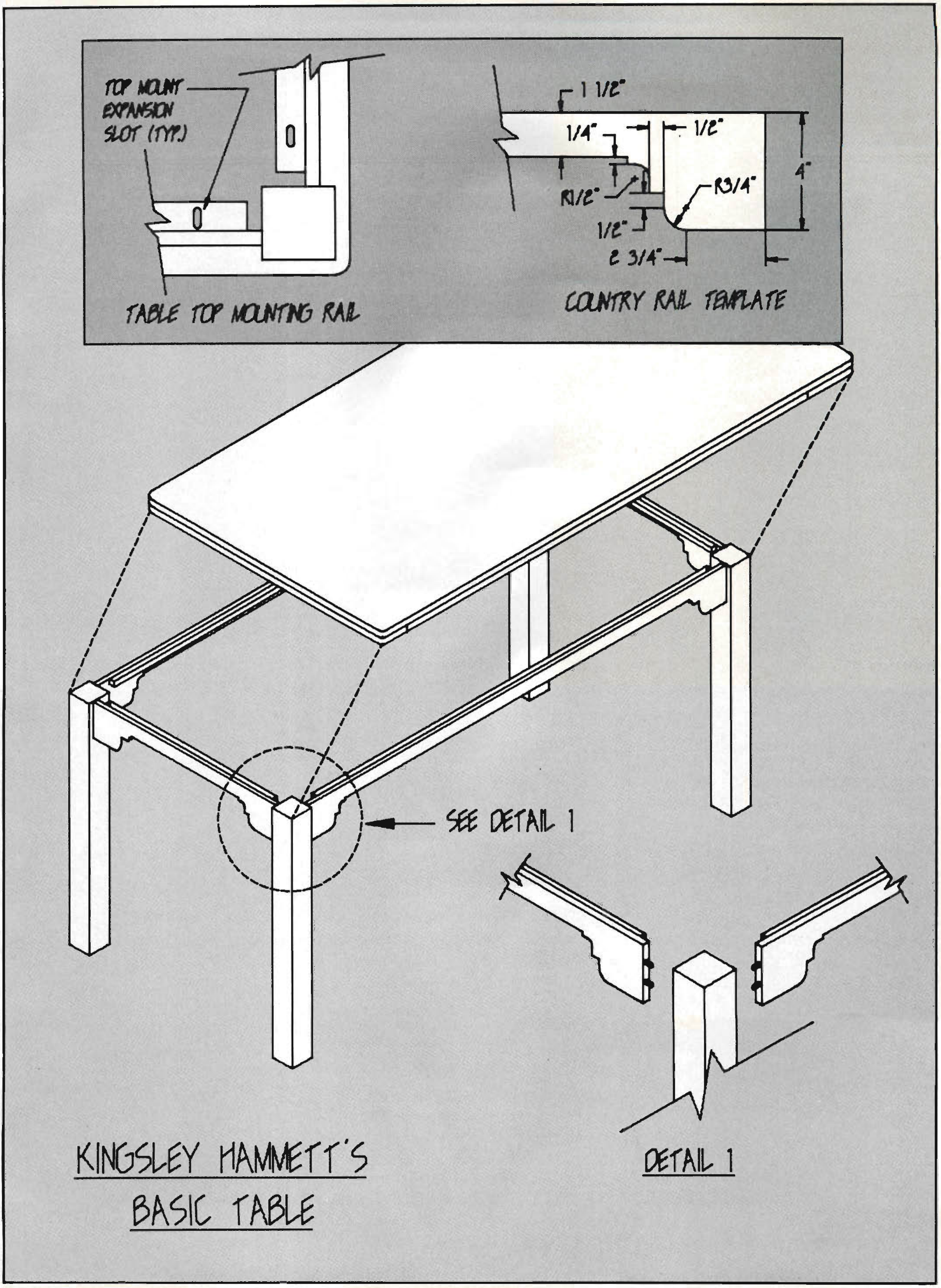


illustrations by Jim Van Beveren

Pau Ferro

by S. Reed Poverny

"There's nothing I *don't* like about it," enthuses instrument maker Emmett Chapman. Craftsman Peter Shapiro feels "it's one of the most beautiful woods out there!" Both men speak of pau ferro.

Pronounced "pow FAIR-oh," which means "ironwood" in Portuguese - it is only one of over 80 different species worldwide that are referred to as "ironwood" (other species include hornbeam, lignum vitae, and tesota). The tree is said to "grow like a weed" in Bolivia, Peru, and Brazil.

Along with "Brazilian ironwood," it's known in the trade as "caviuna," "morado," and "moradillo." Though not a species of rosewood, it is similar to rosewood in appearance and is marketed under the names "Bolivian rosewood," "Rio rosewood," and "South American rosewood."

***S. Reed Poverny** is a wood researcher, woodworker and photographer. His work in a specialty lumber store has given him first-hand knowledge of domestic and exotic woods.*

General Description

As one might expect of an "ironwood," pau ferro is both heavy and hard. It ranges from being slightly harder than slow-grown black walnut, to being nearly the hardness of African blackwood. The oily heartwood varies in color from golden-brown, to pinkish-brown, to the purple-black of Indian rosewood. While its texture can be coarse or fine, single boards are of a uniform texture. The figure in pau ferro fluctuates wildly; it can be mottled, curly, boldly marbled, or without contrast. The distinctive sweet fragrance of the wood is likened by some to walnut.

Working Properties

As with many oily woods, pau ferro can be toxic to some individuals. Continuous breathing of the sawdust without wearing a dust mask can cause irritation to the lungs and nasal passages. Some people also experience a mild skin reaction. One remedy is to apply a barrier cream to the skin before working the wood. Extreme cases include violent skin rashes. One susceptible worker could not even enter a shop where pau ferro had been milled *three days before* without breaking out in hives. There are also people who have no reaction at all to the material.

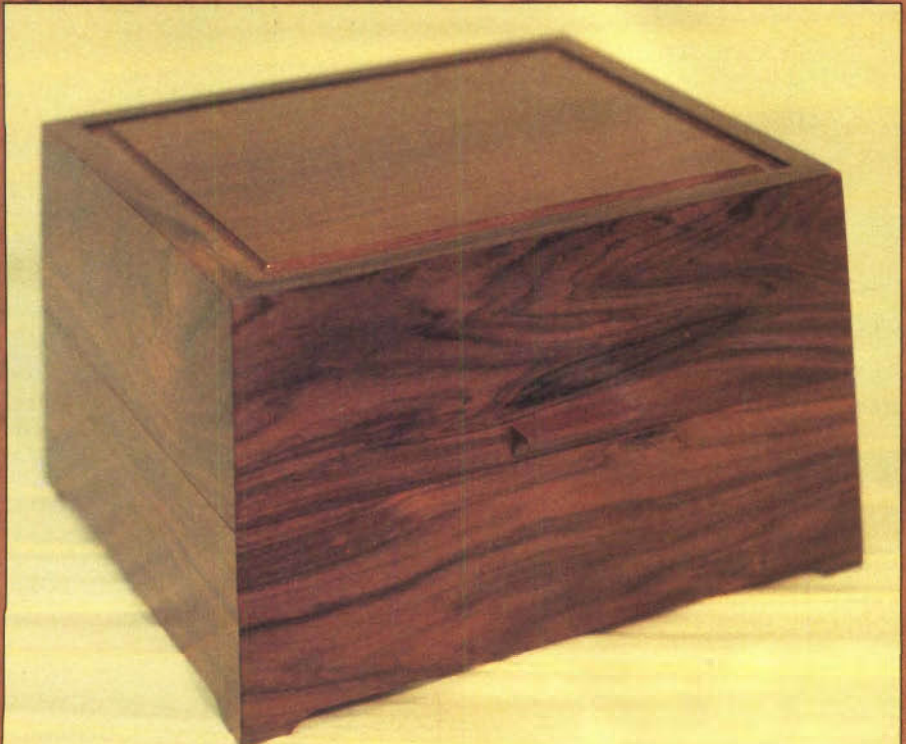
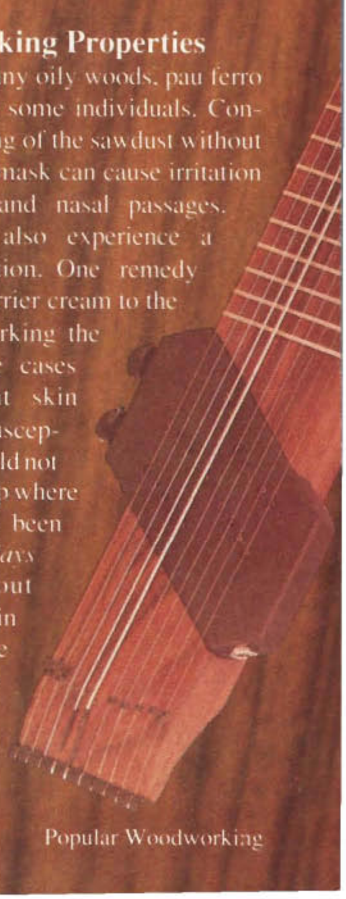


photo by the author

This pau ferro presentation box, in the shape of a truncated pyramid, is the work of Peter Shapiro. The box measures 10" x 9" x 6" high and opens by a Brazilian bloodwood handle.



Emmett Chapman uses pau ferro for the body of the musical instrument he invented, The Stick®

photo courtesy of Stick Enterprises, Inc.

Turning pau ferro is a delightful experience (unless, of course, you are sensitive to it). The wood peels away cleanly and has the consistently smooth working properties of Indian rosewood. When planing, the only time it seems to tear out is when the grain is interlocked on the quarter surface, like one often finds with padauk. Flat cut surfaces are less apt to tear out. Be cautious of grain direction when working with a router or shaper; grain running at an angle can cause the wood to split severely.

Sanding belts get gummed up quickly by this resinous wood. You may find commercial drum sanding outfits reluctant to touch it. Unlike cocobolo, with its tendency to warp, pau ferro is dimensionally stable. It is similar to cocobolo in the gluing department, however, in that it requires extra attention; surfaces must be thoroughly wiped down with acetone before any gluing is attempted. Peter Shapiro found that a catalyzed polyvinyl acetate (PVA) glue, or "white glue," successfully bonded the compound miter joints of his presentation boxes. Epoxy also works for gluing pau ferro, and it can also be used for filling flaws.

Finishing

Beneath a lacquer finish, the color of pau ferro becomes much warmer and richer. The wood has the depth and light-reflecting qualities of satinwood.

For years, Emmett Chapman applied an oil finish to his pau ferro Stick® after sanding the instruments through 400 grit. He now finds that he can achieve a superior finish by simply buffing the raw wood on a buffing wheel with some abrasive compound.

Availability

Under various names, this wood is readily available as veneer, but somewhat harder to find in the form of lumber. Only a few sources around the country seem to have it. It comes milled in 4/4, 5/4, 6/4, and 8/4 thicknesses. Boards are generally narrow, from 4" to 6" wide, and lengths are limited to about 6'. The retail price of pau ferro is slightly more than that of teak.

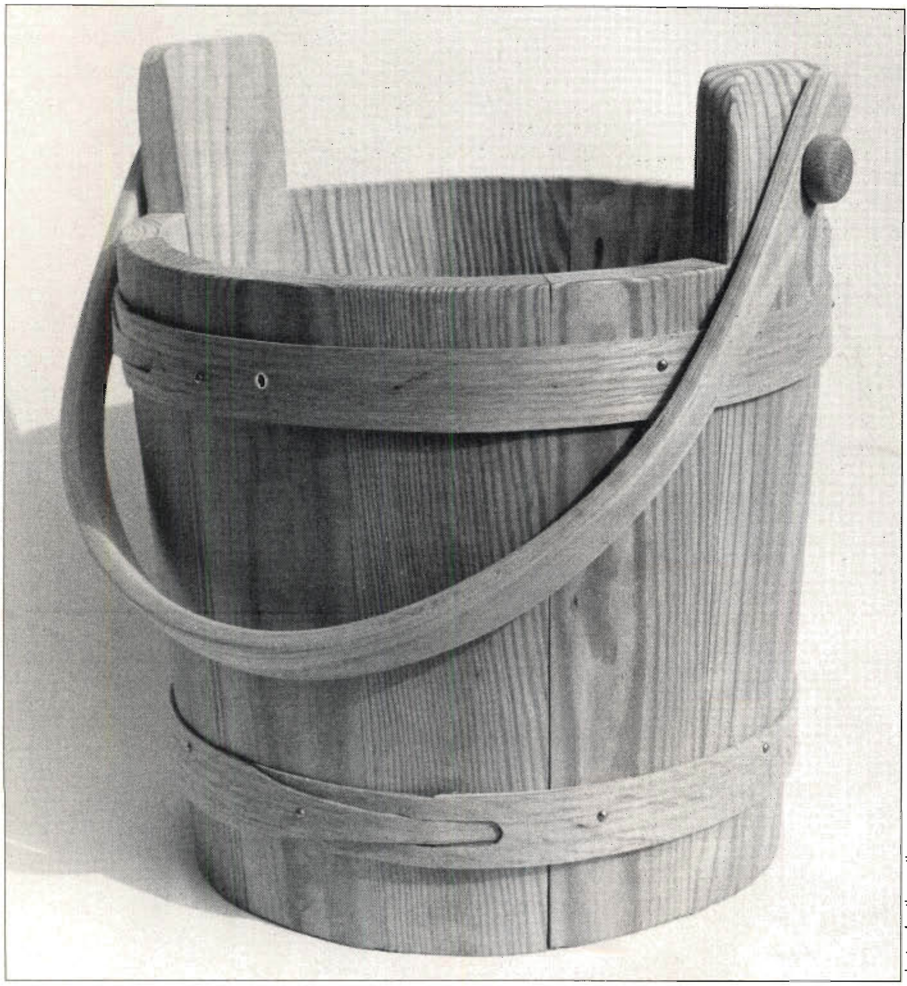
Pau ferro may not be rosewood, but it deserves to be recognized as a wood with outstanding characteristics all its own. PW

The cabinet of this sound system from Infinity® incorporates solid pau ferro and pau ferro veneers.

photo courtesy of Infinity Sound Systems, Inc.

A Popular Woodworking Project

WOODEN BUCKETS



photos by the author

by Warren Asa

Some of my ancestors operated a dairy farm in Switzerland before they came to the U.S. in the mid-1800's. If they were typical, the men fashioned wooden buckets and other cooperage for cheese and butter-making during the winter evenings. If you travel to Switzerland, these items are still sold as souvenirs.

The cooper's trade is an old and honorable one. You need only to examine the strength, accuracy, and beauty of a thousand-gallon wine cask to realize how demanding this profession is. The Greek historian Herodotus referred to barrels in the fifth century B.C. but these may have been simply hollowed-out palm tree trunks. However, stave construction and the cooper were definitely in existence by 500 A.D. Until glass bottles became generally available in the 1700's, stave-built containers were used for storing and shipping most liquids and many dry products. Wooden barrels and kegs were widely used in the U.S. until World War I, but since then, they have largely been replaced by metal and plastic containers. To me, the simplistic beauty of wooden containers will never be duplicated with a mass-produced item, which is why I decided to try my hand at coopering.

The cooper's trade differs from most woodworking because you deal mainly with curved rather than flat pieces. It's a real thrill when they all come together magically to form a bucket right before your eyes.

Coopers use many specialized tools, but I get by with the tools I have on hand. The only tool I used on this bucket that is out of the ordinary is a scorp. These are available from many of the mail-order tool companies for about $10.00. Since I'm not a professional cooper, my methods are not meant to describe the way an old-time cooper would make a bucket, but only my way of doing it.

This bucket is a good first-time cooperage project. You can make it larger or smaller if you like; all of the dimensions are approximate because many things affect measurements in cooperage - especially the thickness of the staves.

Wine and whiskey barrels are traditionally made of white oak, but dairy utensils are made of white pine. I do most of my coopering in yellow pine because I can't beat the price; a friend makes tabletops from the ends of large cable reels and *gives* me the staves. Another advantage is that they are already partly shaped, which saves some time. If you can't find cable reel staves, I suggest you look for some white pine, basswood or poplar that is a full inch thick. Rip this into 1" x 3" stock and make your staves from this. I prefer to use white woods as the Swiss do, but any easily worked wood can be used. If you have a wood lot with suitable trees, you may even want to split out your own staves. Split out pieces along the radius so the staves come out quartersawn; they are easier to work and shrink less if made this way.

For those who enjoy mathematics, making a circular bucket can provide material for all sorts of calculations. If

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***Warren Asa** has been whittling and woodcrafting since his scouting days. He specializes in native American folk craft.*

Figure 1

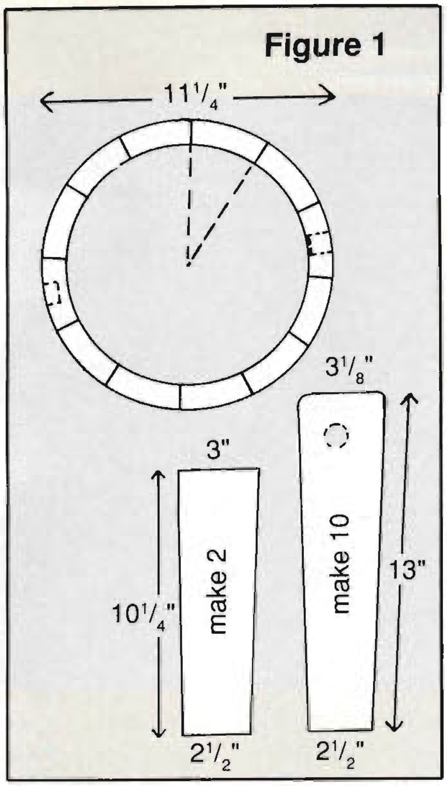
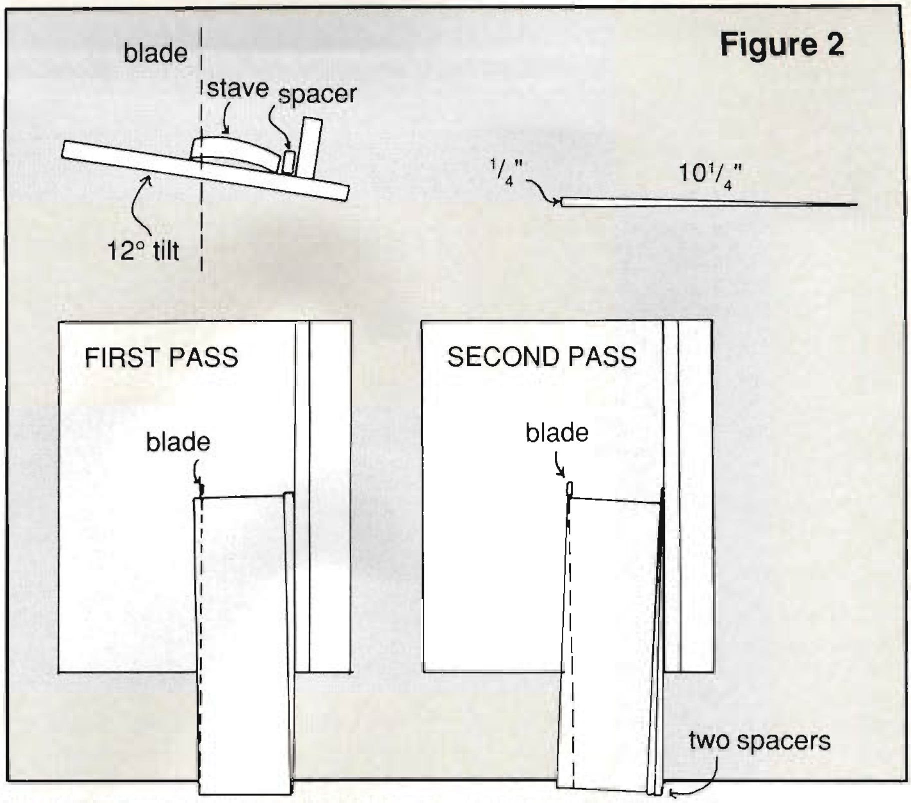


Figure 2



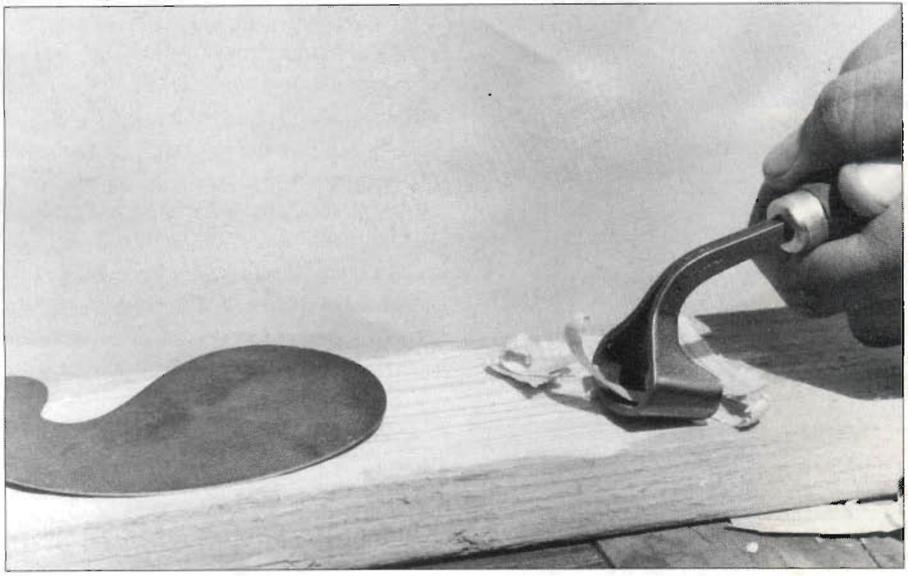
this is your cup of tea, have at it, using $D \times \pi = C$ as your major formula. I simply draw two full-size circles representing the inside and outside circumference of the top of the bucket. From this drawing I can figure the number and size of the staves I need and the approximate angles involved (see Figure 1).

After deciding on the diameter, I shape the staves using a spokeshave on the outside and a scorp or a large gouge on the inside, and smooth with a curved scraper. Then I decide on the height of the bucket, and cut the staves to length. Small buckets like this one usually take ten regular staves and two "handle staves" which are 3" longer.

I use a band saw to cut the bevel on the staves and also to give them their taper. I tilt the saw table to about 10° or 12° for this. To produce the taper, I make two wedge-shaped spacers that are the length of the staves. Cut them 1/4" wide at one end, and taper down to nothing at the other end. Place one spacer (wide end first) between the stave and the fence to cut the first edge, then rotate the stave end–for–end, and make the second cut with both spacers running pointed end first (see Figure 2). If you taper the staves less, your bucket will look chunky, like a cylinder. If you use more taper, you will have trouble getting the hoops that go around the bucket to make contact on both edges. Do all this bandsawing with the concave side down.

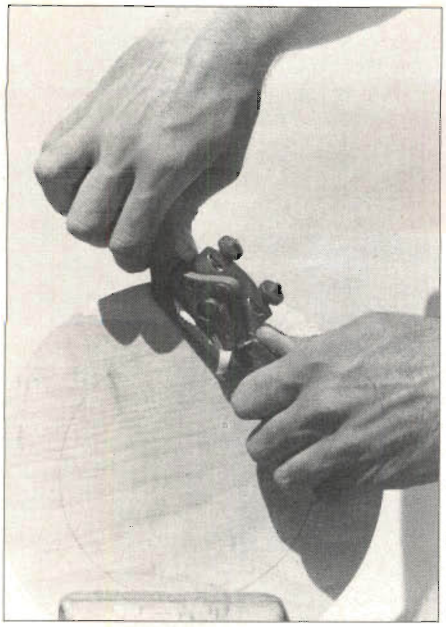
To see how the angles look, I assemble the staves together with large rubber bands or stretch straps. Another set of hands are helpful for this. You will almost certainly need to adjust the stave

Use a scorp and a curved scraper to make the inside surface of the staves concave.



photos and illustrations by the author

Assemble the staves with stretch cords to check the fit.



Taper the edge of the bottom piece with a spokeshave.

photos and illustrations by the author

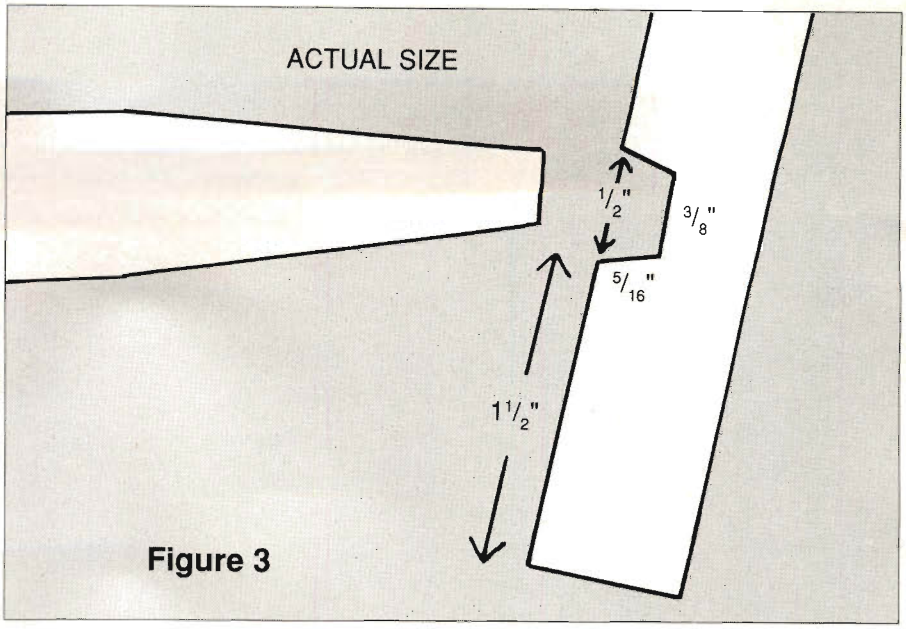
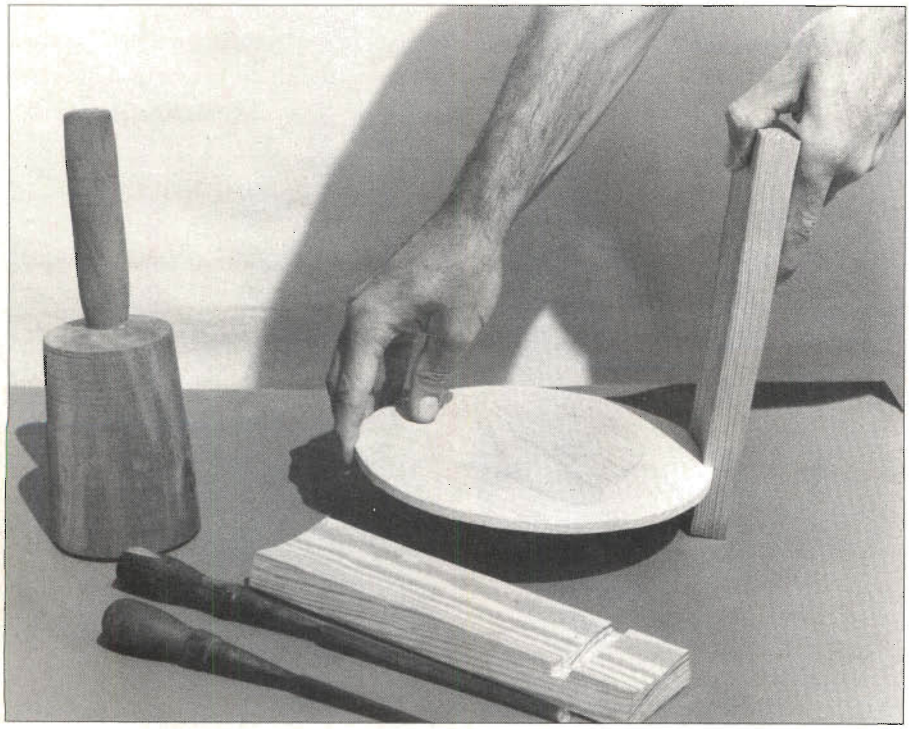


Figure 3

angles. A cooper does this by pushing the staves across a giant upside-down plane. I get good results by mounting a stave in a vise and using a jack plane. Number the staves so each one goes back in its proper location after adjustment. Unlike my ancestors' dairy buckets, mine do not have to be watertight, but I still try to make the joints as tight as possible. I think a bucket looks better with a narrower edge on top, so I shave off about 1/8" from both sides of the stave's tops.

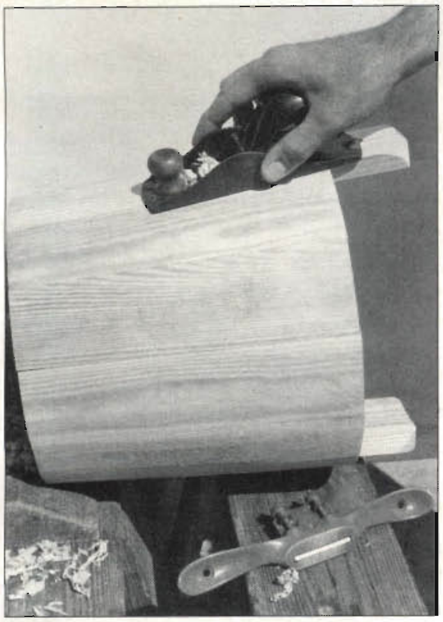
Use chisels to chop a groove for the bottom.



Cut the groove for the bottom at 1-1/2" from the end of the staves as shown in Figure 3. I use 1/4" and 1/2" chisels for this. If your staves are 3/4" thick, cut this groove 5/16" deep. If your staves are thinner, reduce the depth of cut (and the diameter of the bottom piece) accordingly. I make the bottom by bandsawing a circle from a piece of 1 × 10 pine and then tapering the edges of the circle to fit into the groove. The diameter of the bottom should be 1/2" larger than the inside diameter of the bucket at the point where you cut the groove. When you complete the bottom, slide it into place from the top; the bands should stretch enough to allow this.

Make any necessary adjustments and then glue all the staves together with the bottom in place. I use white glue, or urea-formaldehyde if I want the bucket to stand wetter conditions. I do not glue the bottom in place, so it can expand and contract in its groove. Clamp the assembly with band or web clamps, or just tie it tightly with rope. The next day, smooth the outside of the bucket with a block plane and the inside with a scorp or a curved scraper.

The wooden hoops that wrap around barrels and buckets show the old–time cooper at his best. At first glance the joint appears complicated, but it's really the simplest manner of attaching the ends of a wooden hoop. Saw 5/32" strips from white oak or ash that is about 1-1/4" thick. This stock should be straight-grained, quartersawn wood with no blemishes - not even pin knots. I saw mine with a thin-kerf carbide-tipped blade. To figure the length, measure around your bucket at 1" from the bottom and 2" from the top. Add 6-1/4" to each measurement. This is for the two 3" tabs on both ends and to compensate for the thickness of the hoop. Making good hoops requires careful measurements and attention to detail. It is woodworking at its best, where patience and skill will be rewarded with strong, attractive hoops that will set off your bucket to



photos and illustrations by the author

When the glue is dry, round the outside of the bucket with a block plane.

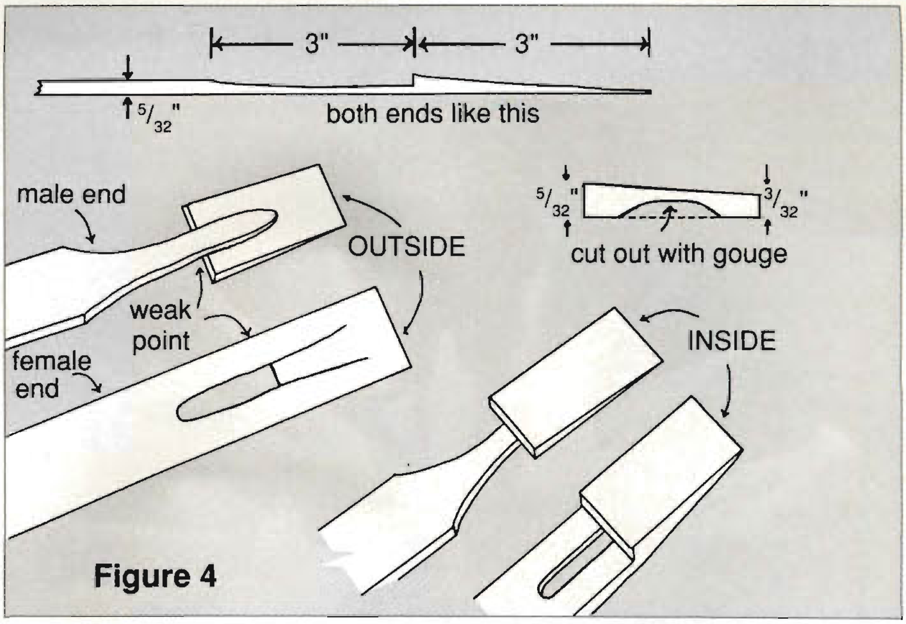


Figure 4

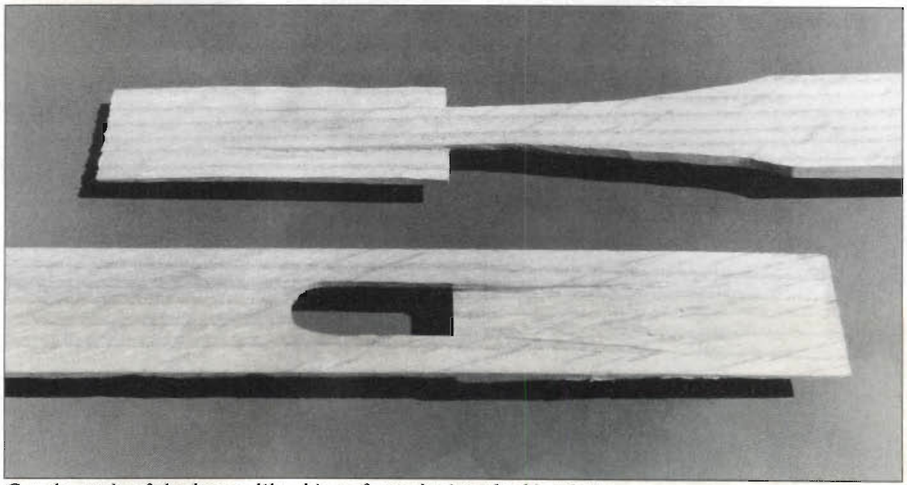
perfection.

Cut the strips to length, then make a mark on the inside surface at 3" from each end. Taper the thickness between these marks with a block plane or spokeshave so that one edge is 3/32" thick and the other is the full 5/32" (see Figure 4). This allows both edges of the hoop to make contact with the slanting sides of the bucket. Next, use a gouge to make a shallow concave groove on the inside of the hoop between the marks.

Start the joint at both ends of the hoop by making a saw cut halfway through the thickness at the 3" mark on the *inside* surface. From this point the strip is tapered to the end. It's also tapered up to the full thickness for 3" in the other direction. The sketches and photo will make this clear. Proceed to carve the male and female ends as shown. The tools I find the most useful for this job are a fine-toothed back saw, a block plane, a spokeshave, 1/4" and 1/2" chisels, a 3/8" gouge, a half-round bastard file, and a sharp pocket knife.

Soak both hoops in a capped length of 2" pipe filled with boiling water. Two soakings of one hour each is usually enough. Tie a lead weight to one end of the hoops to keep them submerged and a string to the other end for easy removal. Be careful, and wear gloves and long sleeves when working with boiling water.

After soaking, flex the ends in a partially open vise as shown in Figure 5. Use great care around the weak points that are



Cut the ends of the hoops like this to form the interlocking joint. The outside surface is shown here.

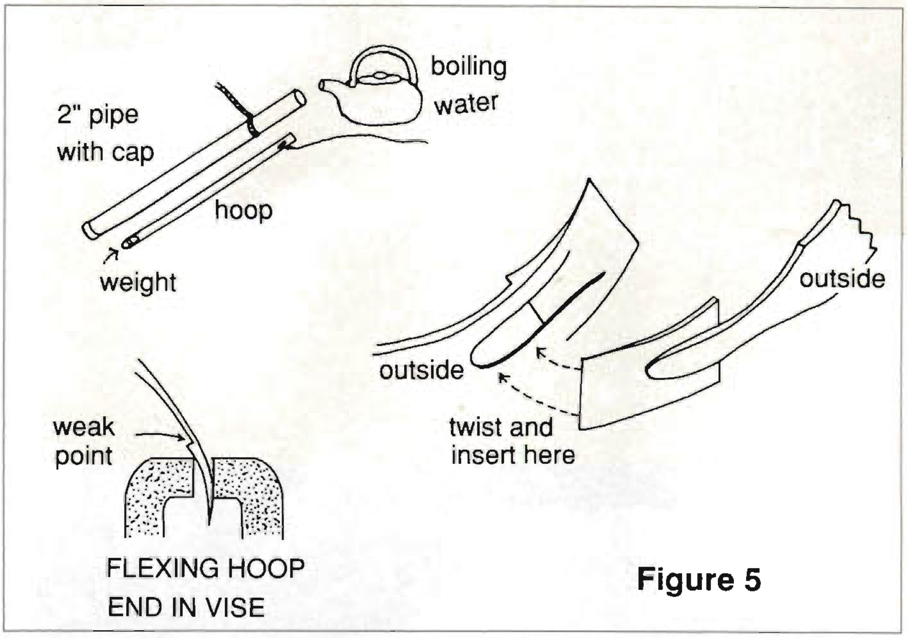
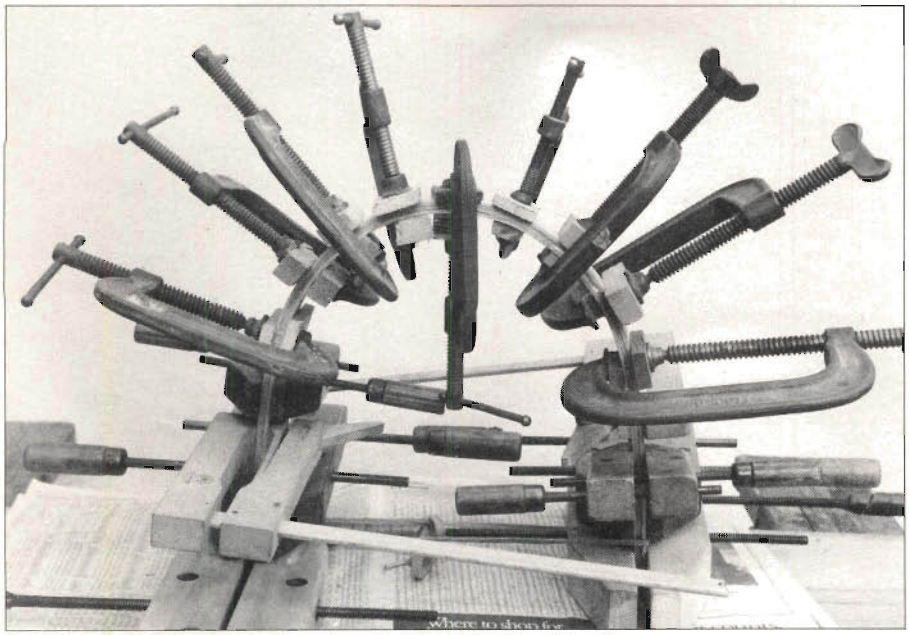


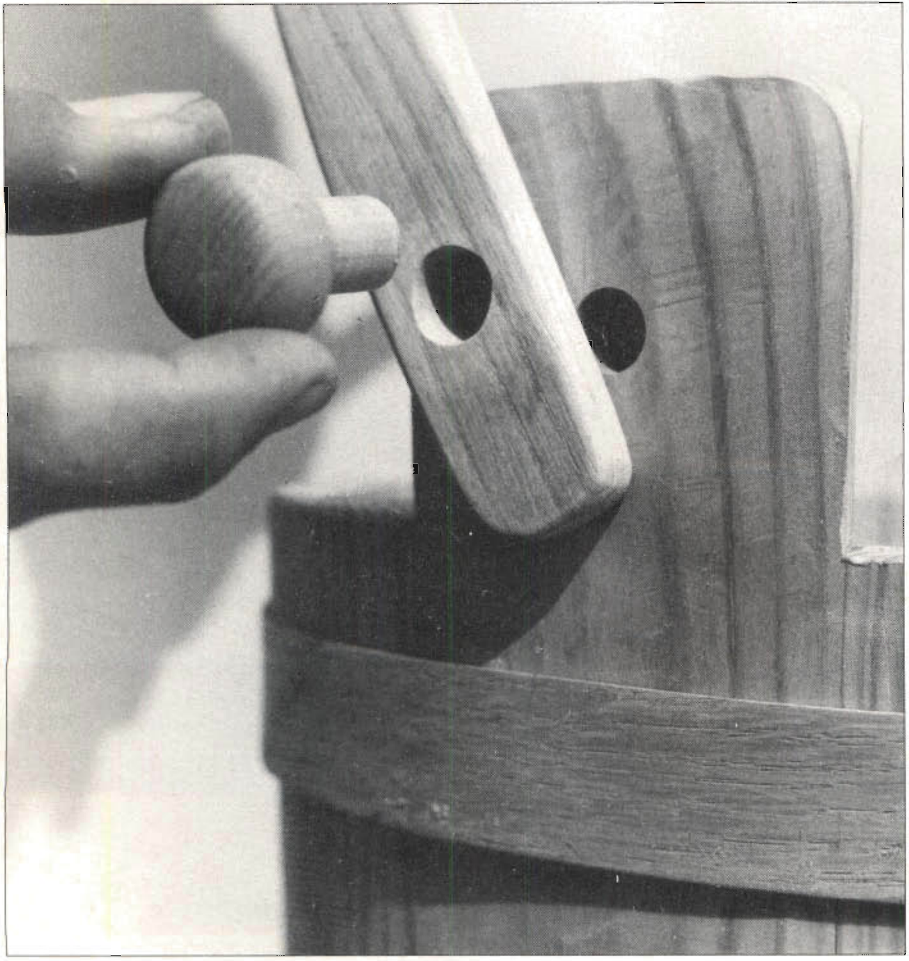
Figure 5

noted in the drawing. Also flex the main portion of the hoop between your hands starting at one end and working slowly and carefully to the other. When you are sure all is ready, pass the male end through the opening as shown in the sketch. It should lock in place. Slide the hoop onto the bucket (thin edge up) and let it dry in place. If your hoops are too short, remove a bit of wood at either end where they lock, or plane the bucket sides a bit thinner. If they are too long, you can insert a bit of wood between the locking points.



Bend and laminate three strips of wood to make the handle.

Attach the handle with a carved mushroom plug, gluing only the portion that fits into the stave.



photos by the author

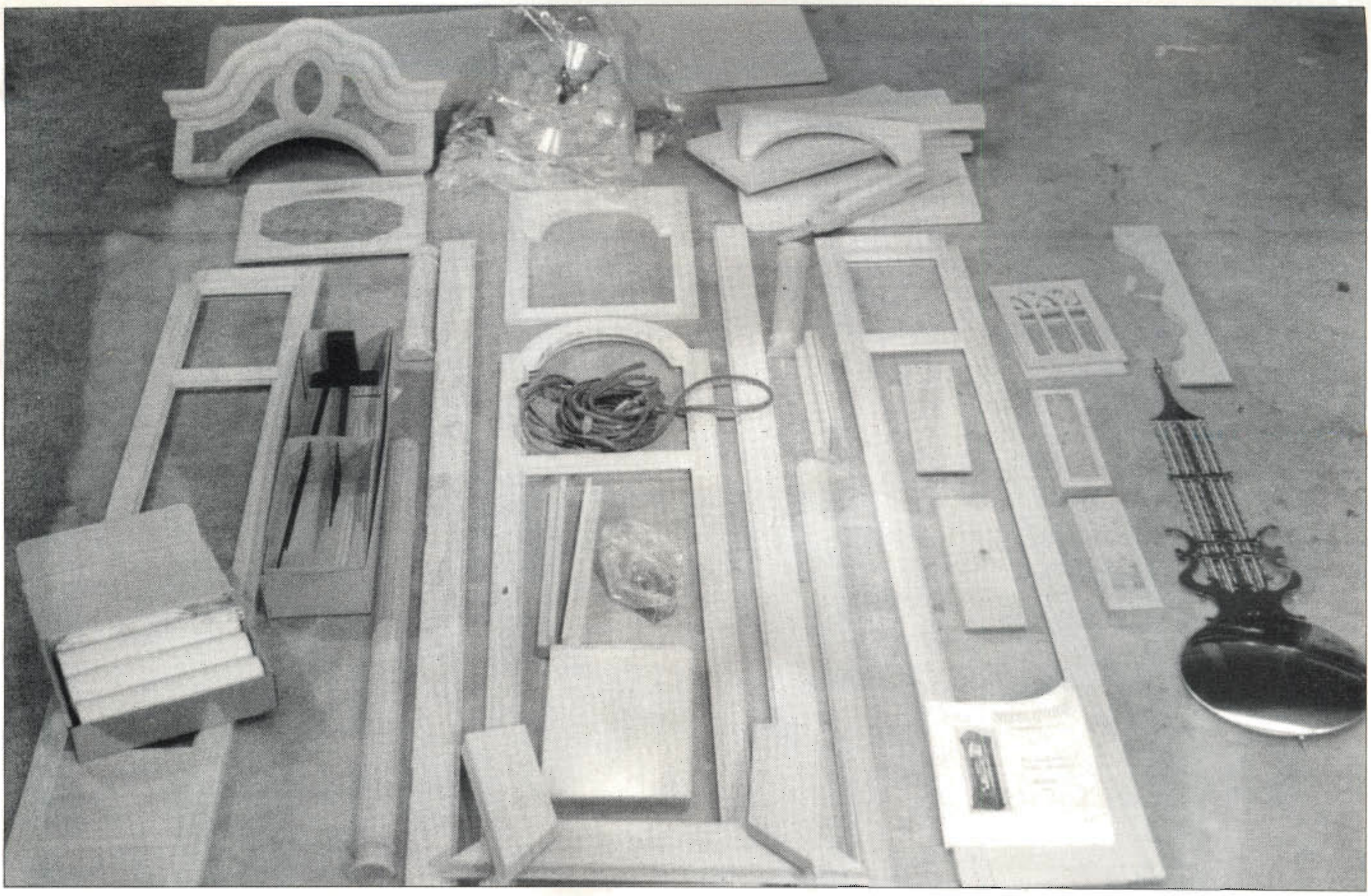
Since your bucket is primarily a showpiece, select the best side to exhibit the two hoop joints. I like to offset them a bit from each other, but that is a matter of personal taste. Slide the hoops up snugly on the bucket, being sure they are equidistant from the top and bottom. I fasten my hoops in place with round-headed, brass escutcheon nails. I put one in every other stave, but stay away from the hoop joint. I nail the second hoop into the other staves. Predrill for these nails - this is no time to have a split mar your work.

I make my handles by laminating three pieces of 5/32" thick ash, but they could also be made of white oak or any easily bent wood. Soak the handle pieces in boiling water for a few hours, using the same pipe as before. Bend them to shape and let them dry. Be sure that the distance between the ends is right for your bucket size. Then, using white glue and every clamp I can find, I glue the handle into a bow. I think a handle looks best if it falls between the hoops when bent down, so I cut mine to that length. I leave the handle full–width at each end but sculpt it slightly over the remainder of its length.

To fasten the handle to the bucket, turn or whittle two "mushroom" pins from maple, birch or beech. Drill 1/2" holes through the handle and partly through the long staves to accept them. Pass the pins through the handle (and washers, if needed) and glue them into the staves.

I prefer to leave my coopered buckets in their natural state, as they were in the dairies of old in Switzerland. If you feel you must have a finish on your bucket, I suggest you don't hide the unique qualities of the cooper's art under a heavy coating, but rather give it a light finish of Danish oil or lacquer. Some of the souvenir Swiss pails are decorated with tole–painted flowers and foliage in blues and reds; that's another finishing option.

Coopering is not for everyone, but if you enjoy challenging woodworking with amazing results, it just may be your ticket. The shavings fly and the pieces you make are vastly different from other projects, but when they come together you have the reward of an unusual project and the satisfaction of knowing you have learned something of the ancient art of coopering. PW



"The Newport," unboxed and ready to go.

Clock Kits

by John A. Nelson

In the past, making a clock was only for the truly professional craftsman with all kinds of expensive woodworking equipment, but in recent years clock kits have become very popular. Thumb through any woodworking magazine and you will find many fine companies offering clock kits of all kinds, styles, sizes, and price ranges – a clock for everyone.

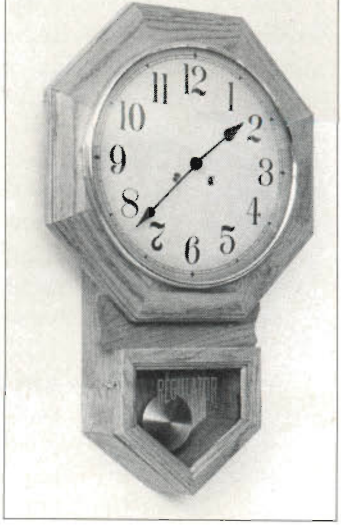
Kits, whether they be a clock kit or one of the many other furniture kits available, offer positive alternatives for many people. The person who may never have tried woodworking before will gain a wealth of information in regard to kinds of joints used in woodworking, assembly techniques, and steps in applying a finish to a project. Hopefully the experience gained in building and finishing this kit will give them the confidence to attempt more advanced projects. The clock kit can be used by the woodworker who perhaps does not have all the required power tools (such as a shaper, lathe, or planer) to make some of the unusual parts needed to complete the project. Some people just like putting things together and adding finishes. The clock kit is perfect for them. I believe one could also make a profit building and selling kit clocks – especially with all the "plastic" clocks in the store today.

***John A. Nelson** is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of more than 15 books on those subjects, including* Antique Furniture Reproduction *(Van Nostrand Reinhold Company, Inc., 135 West Street, New York, NY 10020).*

Testing the Kits

I wrote to ten companies that sold clock kits and asked if they would care to participate in this review. Each was asked to send a clock kit of their choice to build. Six companies responded with kits for me to write about. What follows are my reactions and impressions based upon notes I took as the six kits were built. I constructed them all within the same time frame so I could "feel" the differences and similarities between the various kits.

Brookstone's Schoolhouse Clock



The Schoolhouse Clock, from Brookstone Co. (product #B10819), list price $149.95, estimated construction time: 4–5 hours.

Brookstone sells tools, accessories, and three or four clock kits. I hate to start on a sour note, but of all six clocks I built, this one was the least desirable. If I had built only this kit, I probably would never have built another kit of any kind; perhaps I got their "lemon." Brookstone, of course, stood behind the kit – as they do all their products, but it was frustrating and time–consuming to replace or rework poor parts. The joints of the octagonal dial frame were way off, so the pieces had to be replaced. The winding holes for the dial were over 1/4" off and had to be redrilled. The supports for the dial bezel are not strong enough to adequately support the glass door when it is open. To make matters worse, the case is actually 1/2" too short for the movement – the pendulum hits the bottom of the case when adjusted correctly. I was very impressed, however, with the "clamp nails" that were used to secure the bottom boards of the case. This was the first time I had ever used them, and they work great. Overall, after the problems were solved, the clock is a nice–looking clock.

Chiming Clock from Craftsman's Corner

Chiming Clock with Music Box, from Craftsman's Corner (product #469-Y), list price: $249.00, estimated construction time: 6–7 hours.

This clock combines the best of two worlds, a very nice clock and a music box that can play over 130 different melodies. It uses small, record like disks that change the melody.

This kit was very easy to assemble and finish. The instructions were well–written and illustrated, and all the parts fit together perfectly with no problems whatsoever. The movement is a very nice "bim–bam" chime on a set of well–tuned bells. This was a fun kit to build and fits into any room nicely.

Craftsman's Corner manufactures and sells all kinds of kits besides clock kits. Their catalog offers many interesting projects.

Bracket Clock, from Klockit (product #34049), list price: $149.95, estimated construction time: 6–7 hours.

This clock is very similar in design to the elegant bracket clocks of yesteryear. The design and form are excellent. It's movement can be viewed from both sides through arched glass windows. This clock has a rich–looking brass dial with etched time ring and numbers; it plays the traditional Westminster chime melody on the quarter–hour and strikes the time on the hour.

Bracket Clock from Klockit

This kit was also a joy to build. The instructions were well–

As Time Goes By

by John A. Nelson

In a way, the world is a clock – its rotation creates day and night. Even in ancient cultures time was important, mostly for planning, planting, and harvesting. In those days the actual hour of the day was not particularly important.

Very early clocks used the sun to measure time, but as the need for more accurate timekeeping increased, many other kinds of devices were tried and used. The hourglass, indexed candles that burned at a fixed rate, and water power were but a few of these first time–measuring devices. The first all–mechanical clock was said to have been made circa 1250 in Italy.

To early colonists, owning a clock was a mark of success rather than a commitment to punctuality. A clock was found only in the finest of homes, displayed in a prominent place for all to view.

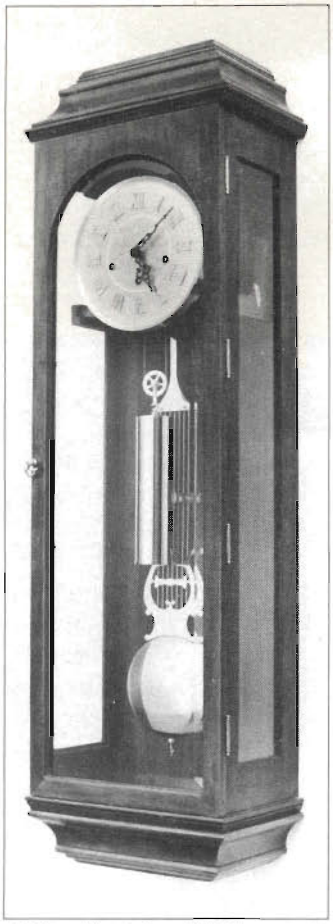
It was not until the Industrial Revolution came about, with such things as factory working hours and train schedules, that the establishment of a standard hour really brought about written and illustrated, and the parts went together as they were designed.

Klockit specializes in clock kits of all kinds from very small to grandfather types, quartz movements, clock plans, and hardware.

"The Spirit of Liberty" from Kuempel Chime Clock Works, list price: $495.00, estimated construction time: 7–8 hours.

This kit is an easy and enjoyable weekend project, even for those who have never done any woodworking before. It's very easy to build as all the difficult work is already done for you. The tough mitered corners of the base and crown are already assembled, and the sides and door are very nicely assembled also. All holes are pre–drilled, and it comes ready–to–assemble and finish. The materials used throughout are of highest quality, and the instructions are easy to understand and follow. As the clock is quite heavy, it comes complete with its own unique built–in wall hanger.

The Spirit of Liberty comes with beveled glass on all three sides, and the solid brass movement chimes any one of three different beautiful melodies.



"The Spirit of Liberty"

Kuempel Chime Clock Works has been in business since 1916, and they first developed the concept of clock kits for everyone. If you scratch-build a clock, they sell movements also.

"Simon Willard Banjo Clock" from Mason and Sullivan (product #7680 NGW / $212.00) with pediment (product #7681W / $49.00), movement (product #3340X / $49.00), and glass (product #2775G / $29.50), estimated construction time: 8–9 hours.

This clock may look complicated, but in reality it is very simple to make. The instructions are excellent and fully–illustrated. They even list what tools will be required to complete the next step as you proceed, which I thought to be helpful.

The quality of all wood and hardware was excellent throughout, and the clock went together very easily.

My only disappointment was in the final step –installing the glass. All the other kits (except the Spirit of Liberty) had a slot to slide a soft piece of plastic into to secure the glass in place. Installing the glass in the Willard Banjo clock involved pre–drilling a somewhat stiff length of plastic quarterround and nailing it inside the door to secure the glass. This was somewhat difficult, and extreme care had to be taken so as not to break or scratch the reverse–painted glass. Perhaps the other kits spoiled me somewhat; the Spirit of Liberty, for instance, used small metal hangers that were easily screwed in place to secure the glass. Other than installing the glass, this was an excellent kit to build. Mason and Sullivan has been in business for over 40 years

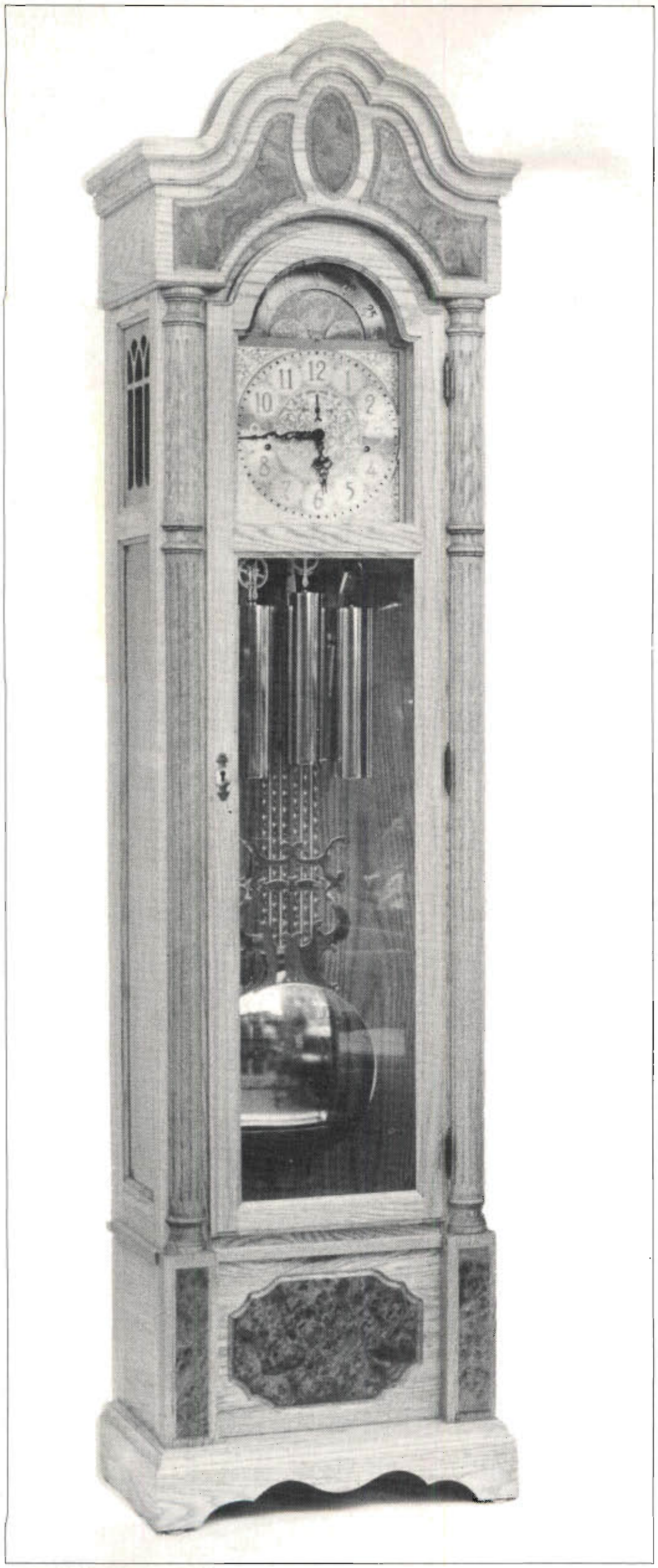
"Willard Banjo Clock"

Mason and Sullivan's Willard Banjo Clock comes complete with gold gild.

clockmaking to the world.

The "new" manufacturing methods of the 1800's made clocks affordable to the average family, and they were cherished for their beauty as much as for their ability to keep accurate time.

Early clocks were mounted high above the floor because they required long pendulums and large, cast–iron descending weights. They were simply mechanical works with a face and hands, and they were referred to as a "wag–on–the–wall." The long–case clock, now known as the grandfather clock, actually evolved from these early wall clocks. Most early clockmakers were skilled only in metalworking and not in wood techniques. They therefore commissioned jointers to make the cases. These jointers used the same techniques and styles that they used in making furniture of the day. Their first cases tended to follow architectural features, (square or rectangular boxlike bases, topped by arched or triangular pediments), and had a classical, temple look. In time, stepped or panelled tops with finials were added to the clock cases.



Westwood Clocks 'N Kits' "The Newport"

and their clocks tend to be reproductions of popular antique clocks. They sell pre–cut kits, kits with the wood and instructions only, or just plans and hardware. They also sell movements and hardware for those who scratch–build.

"The Newport," from Westwood Clock 'N Kits (product #G160), list price $700.00, estimated construction time: 10–12 hours.

Of course, the granddaddy of them all is the longcase clock. This is a lot more than just a clock; as years pass, it probably will become a family heirloom. As difficult as this might appear, it's really not any more difficult to build than any of the other clock kits. I think the most intimidating part is when you first see the five large boxes it comes in. I picked up my clock at the truck terminal, and it filled the back of my full–size station wagon. Now that *is* intimidating!

My only complaint with this kit was that I finished too fast. I was enjoying it so much, the time just flew by. Except for locating and drilling all the various holes, this kit was very easy to assemble and everything went together perfectly the first time.

This clock is made of solid – and I do mean solid – oak. I cannot believe how heavy this clock is when finished – the door itself is a full 1" thick. The clock features beveled glass throughout, a beautiful filigree brass moon dial with raised numbers, and a triple chime movement with a huge lyre pendulum. Only the highest quality materials were used throughout this kit.

It came with complete, well–written and illustrated instructions and even included a video tape to aid in construction.

If you are a beginner, don't be afraid to try building a grandfather clock kit; they look a lot tougher to build than they actually are. They are very similar to building a smaller clock; it's just on a somewhat larger scale.

Westwood Clocks 'N Kits make all kinds of clock kits, from wall clocks and shelf clocks to the stately grandmother and grandfather clocks. For those who scratch–build clocks, they sell clock movements, dials, beveled glass of various sizes, and a complete line of hardware.

Purchasing and Building a Clock Kit

The first step in building a clock kit is to select a reputable company that offers the model or style of clock you would like to make in your price range. I recommend companies that specialize in making kits and that have been in business for a few years. This is important because if you should have a problem or need advice, you know they will be there to help.

Upon receiving your kit, check the carton for noticeable rips or dents before accepting it. Uncrate the carton immediately and check for broken parts or glass. If there is any problem at all, report it at once.

Take an inventory of the parts. Taking inventory was very easy; all six kits I received had a parts list along with illustrations of each and every part – including hardware and glass. Nothing would be more frustrating than planning your weekend around your clock kit project, only to find halfway through, that some important part was missing. Put the clock movement away in a dry, dustfree area until the final steps. Keep it out of your workshop, and do not let any dust or dirt get anywhere near your new movement.

The next important step is to completely read and study all instructions. Build the kit in your mind as you study. Later, go back and reread step–by–step as you actually build your clock.

Some kits were especially helpful as they illustrated each step and noted exactly what tools you would be using for that particular step. Go slowly – enjoy yourself; do each process in the order suggested. Be sure to dry–fit each piece before actually gluing them together. I like to sand all the flat pieces before assembling – this makes it easier later. Take extreme care not to get any glue on any surfaces that are to be exposed or finished. Any excess glue should be left alone for 15 minutes or so until it forms a "skin," and then remove it with a chisel. Never wash excess glue off with water, as this dilutes the glue and allows it to penetrate deeper into the wood pores, making it difficult to obtain a good finish.

If the kit took you six hours to assemble, plan to spend six hours applying the finish. The finish is what everyone will see for years to come, and most will probably judge your work by it. As one or two kit companies stressed in their instructions: sand, sand, and sand some more!

After the case has its finish applied and waxed, add all the hardware. Most kits used brass screws which are not as strong as the usual steel screws, so be sure to drill pilot holes and do not force the screws. I know – I broke off two screws while building these six clocks.

Carefully install the movement following all instructions. Remember, the movement is a precision instrument that is very delicate, so take extreme care in handling it. Having worked on clocks for the past 10 to 12 years, I would say the largest problem I find is that they are out of beat – that is to say, they do not "tick–tock" evenly. This is the easiest of all problems to solve. After the movement has been installed into your clock case, hang the pendulum and wind the clock. Gently start the pendulum swinging and listen to the tick–tock. If it sounds like "tick—tock-tick—tock-tick—tock," or "tick-tock—tick-tock—tick-tock," for instance, it is out of beat and must be adjusted. To adjust the clock, push the pendulum to one side until you feel it give slightly. Start the clock and again listen to the beat. If it has been improved, try it again until the clock beats perfectly. If it's worse, push the pendulum in the opposite direction. Note: some clocks come with a self–regulating system and do not need adjusting. Once the beat is correct, add the hour hand; this is usually a tight slip–fit. The minute hand usually fits onto a square or rectangular shaft. If your clock chimes, you might have to experiment to get it in the correct position so it chimes when the minute hand is at 12 and sometimes at 6. The hour hand can be slid to the correct hour.

Once the clock is in beat and the hands are on, set it to the correct time and check it in 24 hours. If it is running too fast, lower the pendulum bob by turning the round nut below the pendulum–bob a turn or two; if too slow, raise the pendulum bob (up for "speed–up"; down for "slow–down"). Let the clock run for 24 more hours, and note if it has gained or lost time. Then re–adjust until the clock keeps perfect time.

The movement comes already oiled but must be re–oiled every five years or so. Use only clock oil and apply it very lightly and only where the shafts contact the plates. Remember, too much oil is just as bad as no oil at all.

A clock is very different from all other projects a woodworker can build. A clock adds life to any room it is placed in. It's always moving; it's always making a noise; it provides a service by faithfully recording the time of day or night. By its very nature, the clock gives companionship to anyone that is near, and will be admired for many, many years to come. PW

For More Information

Listed below, in alphabetical order, is a list of companies that make or sell clock kits. If you are interested in building a clock kit, it would be a good idea to write to each for literature and prices. I wish to thank those companies (indicated by a * below) who were proud enough of their products to provide a kit for this article. If any companies that make clock kits are missing, it was not intentional; I simply am not aware of them.

*Brookstone and Co.
Vose Farm Rd.
Peterborough, NH 03458

*Craftsman's Corner
4012 N.E. 14th St.
Box AP
Des Moines, IA 50302

Emperor Clock Co.
Emperor Industrial Park
Fairhope, AL 36572

H. De Covnick and Son
P.O. Box 68
Alamo, CA 94507

*Klockit
P.O. Box 629
Lake Geneva, WI 53147

*Kuempel Chime Clock Works
21195 Minnetonka Blvd.
Excelsior, MN 55331-8605

*Mason and Sullivan Co.
586 Higgins Crowell Rd.
West Yarmouth, MA 02673

Turncraft Clock Imports Co.
6540 Plymouth Ave. North
Golden Valley, MN 55427

Viking Clock Co.
Dept WD457
P.O. Box 490
Foley, AL 36536

*Westwood Clocks 'N Kits
2850 "B" East 29th St.
Long Beach, CA 90806

The companies listed below sell only clock hardware and movements. They do not sell kits but should be noted for those of you who wish to scratch–build a clock or need special hardware.

Cas-Ker-Co.
P.O. Box 2347
Cincinnati, OH 45201

R. V. Tapp Imports
13525 Alondra Blvd.
Santa Fe Springs, CA 90670

S. Larose Inc.
234 Commerce Place
Greensborough, NC 27420

Selva-Borel German Clock
347 - 13th St.
P.O. Box 796
Oakland, CA 94604

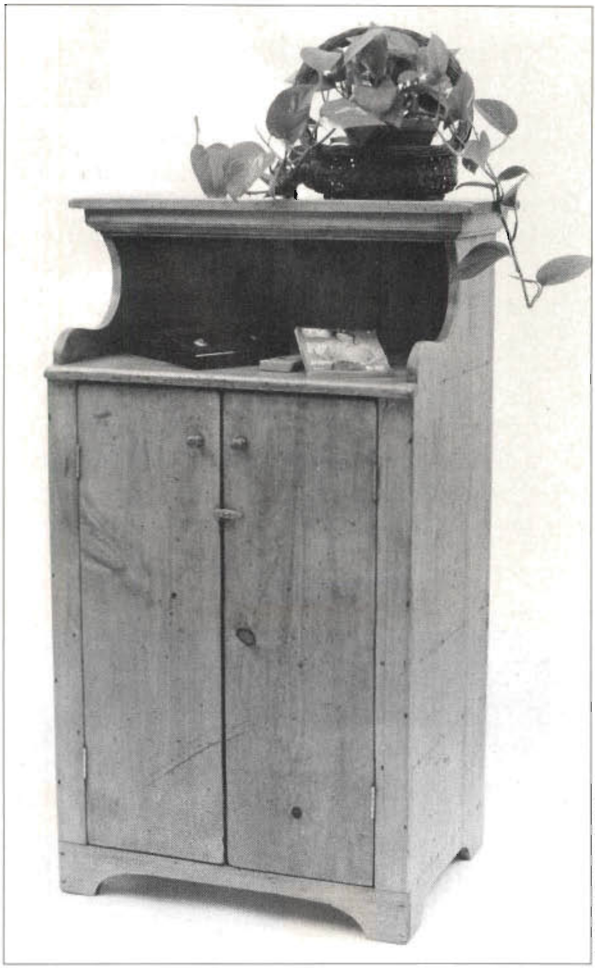
Empire Clock Inc.
1295 Rice St.
St. Paul, MN 55117

Merritt Antiques Inc.
RD 2
Douglassville, PA 19518

In the event you really get the "clock bug" you might wish to join the National Association of Watch and Clock Collectors, Inc. (NAWCC), 514 Poplar St., Columbia, PA 17512. This is a national organization devoted solely to horology (watches and clocks). It has a national network of local clock clubs throughout the country that hold meetings and help each other with clock problems, study history of clocks, buy and sell clocks of all descriptions to each other and teach each other various aspects of clock repair and making. It is a great organization to belong to if you are interested in clocks. PW

A Popular Woodworking Project

A Dry Sink TV



photos by Deborah Porter

by John Nelson

For over 30 years my wife and I have collected antiques - not the formal expensive kind, just the "country" type from around 1875 or so. Although our house is a new split cape, Joyce stenciled the walls of the house to further add to the 19th century atmosphere. For years, the plastic television set with its make-believe wood pattern sat smugly on an antique table surrounded by our antique setting. To make things worse, when we added a VCR to our "setting" we ended up putting it under the television set - accentuating the whole mess even more!

One day while looking through one of those "country home" type magazines, I spotted an antique dry sink. Early Americans used little cupboards like these as a washstand. A bowl and water pitcher sat on top, and towels were stored below. I thought, "Why not hide that dumb TV inside one of those?" By stretching the width of the sides a little, I came up with this design. The result is a "new" old-style dry sink that hides the television, VCR and all the videotapes.

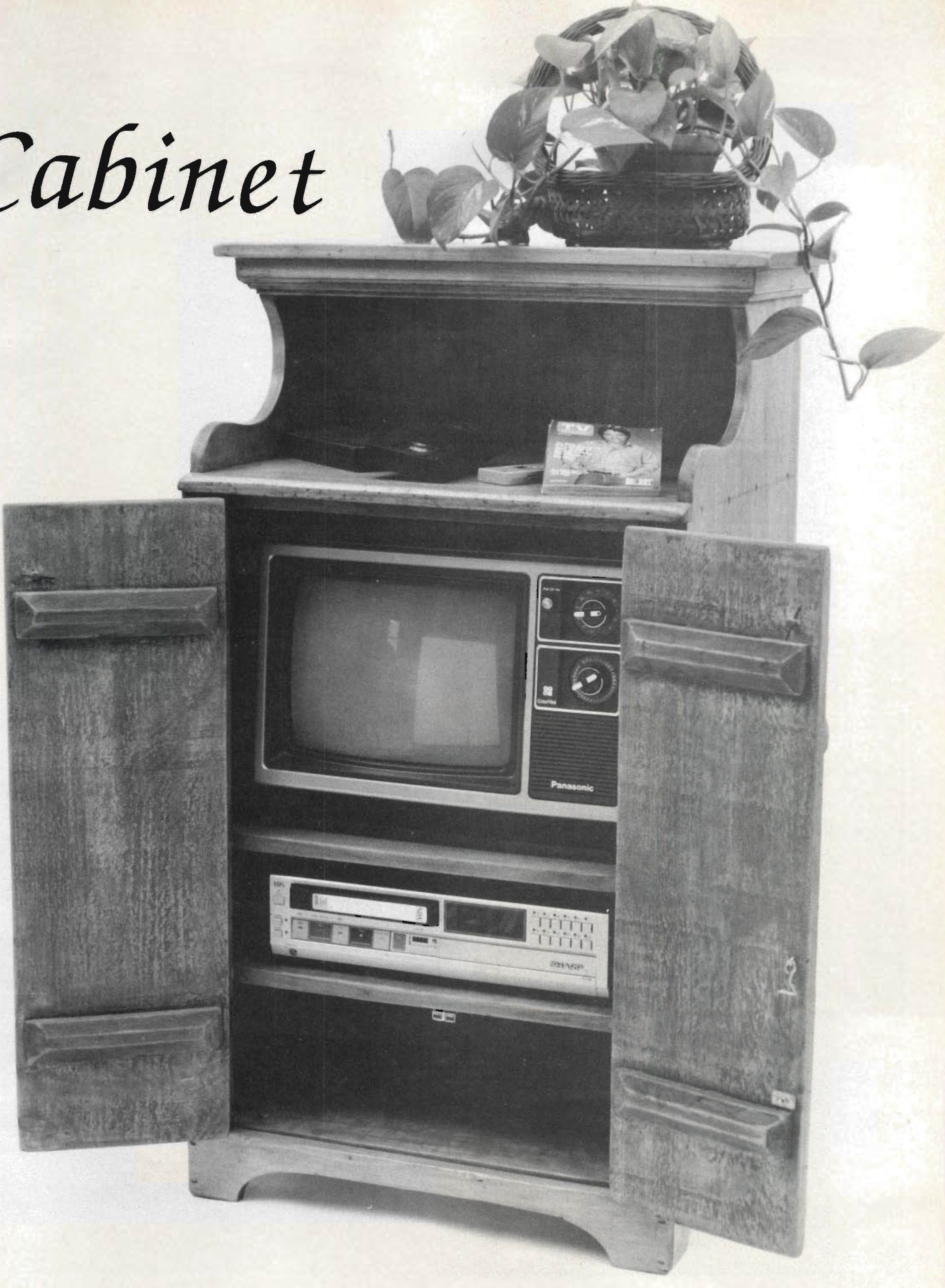
John A. Nelson is a woodworker and drafting instructor from Peterborough, New Hampshire, and the author of more than 15 books on those subjects, including Antique Furniture Reproduction *(Van Nostrand Reinhold Company, Inc., 135 West Street, New York, NY 10020).*

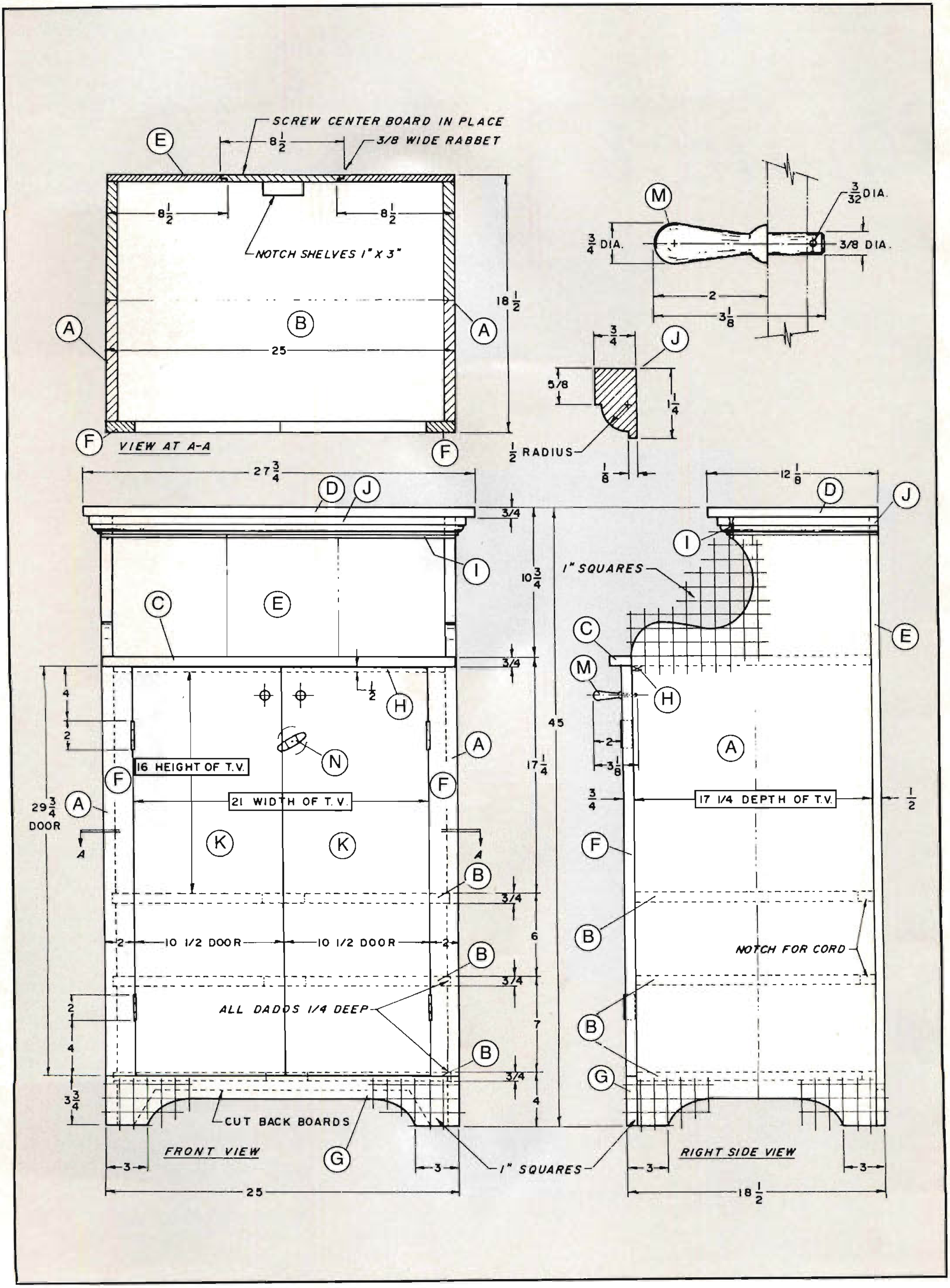
Before beginning, carefully measure your television set. Measure from top to bottom, side to side, and front to back. When measuring from front to back, be sure to include the knobs in the front of the set and add at least 1/2" extra. As is, this dry sink is designed and dimensioned to take a television set that is 16" high, 21" wide and 17-1/2" deep (including the knobs). Any set that is slightly larger in size will mean changing some of the dimensions; the overall design should not be affected too much. If your VCR is top-loading, you'll need to design with that in mind, too.

Start by gluing up panels from solid stock for the sides (A), shelves (B), and top shelf (C). You'll need approximately 25 board feet. After the glue has set, cut the parts to their overall sizes according to the cutting list. Carefully lay out and cut the 1/4" deep × 3/4" wide dadoes in the inside surfaces of the sides (A). Lay out 1" squares on a sheet of cardboard and enlarge the pattern shown in Figure 1. Tape the side pieces together with the dadoes on the inside, and transfer the pattern onto them. Cut out the two pieces as a pair, making a right and a left side.

Cut a 1" × 3" notch out of the back of the shelves (B) for the wires from the television and VCR. Glue and nail the shelves and the top shelf (C) to the sides, taking care to keep everything square. For authenticity, I would suggest using square-cut nails.

Cabinet




SCREW CENTER BOARD IN PLACE
3/8 WIDE RABBET
E
8 1/2
8 1/2
8 1/2
NOTCH SHELVES 1" X 3"
18 1/2
A
B
A
25
F
VIEW AT A-A
F
M
3/4 DIA.
3/32 DIA.
3/8 DIA.
2
3 1/8
3/4
J
5/8
1 1/4
1/2 RADIUS
1/8
27 3/4
D
J
3/4
12 1/8
D
J
I
10 3/4
1" SQUARES
I
C
E
C
E
3/4
M
H
1/2
H
4
2
A
N
45
16 HEIGHT OF T.V.
17 1/4
2
3 1/8
F
F
A
29 3/4 DOOR
A
21 WIDTH OF T.V.
3/4
17 1/4 DEPTH OF T.V.
1/2
A
A
K
K
F
B
3/4
B
2
10 1/2 DOOR
10 1/2 DOOR
2
6
NOTCH FOR CORD
B
3/4
2
ALL DADOS 1/4 DEEP
7
B
4
B
3/4
G
3 3/4
4
CUT BACK BOARDS
3
FRONT VIEW
G
3
1" SQUARES
3
RIGHT SIDE VIEW
3
25
18 1/2

Add the narrow top (D).

Cut the back boards (E) to size, and rabbet the edges of the boards to create the removable back panel. The two outer boards each have a rabbeted side and the center board has two rabbeted sides. Glue and nail the two outer boards, then screw the center board in place. This will give you access to the back of the television and VCR later.

Cut the stiles (F) and bottom skirt (G) to size, and glue and nail them in place. Add the dust stop (H), top trim (I), and the moulding (J), taking care to cut 45° angles where the parts meet.

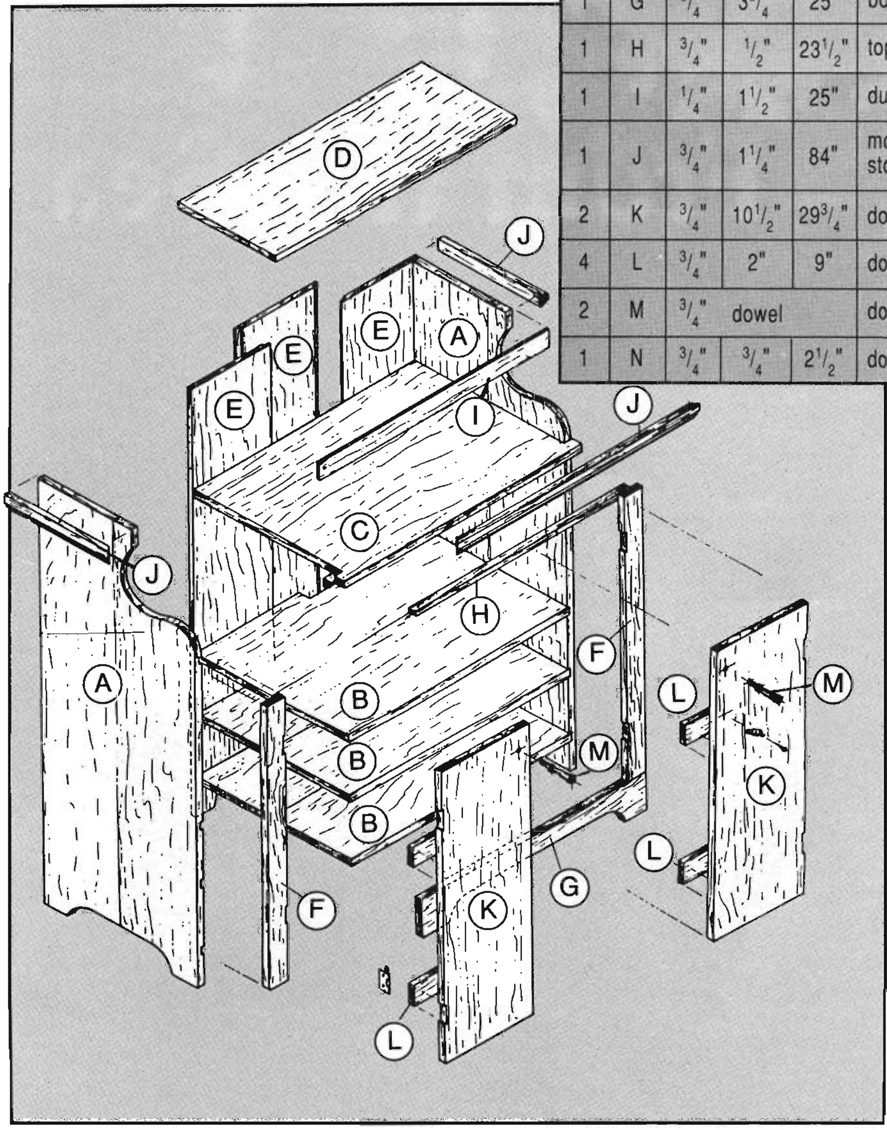
Cut the doors (K) and the door battens (L) to size. Check the television set and note the locations of the knobs on the front and also note the location of the shelves. Take care to locate the door battens above or below the knobs and shelves so they will not interfere when closing the doors. Battens in old pieces such as this were usually nailed through from the front into the batten and sinched (bent) over.

Mortise the doors and the stiles for the hinges. Locate them 4" up and 4" down from the edges of the door, as illustrated.

Dry Sink TV Cabinet

Cutting List

Qty.	Part	Finished Size T	W	L	Piece
2	A	$^3/_4$"	$17^1/_4$"	$44^1/_4$"	sides
3	B	$^3/_4$"	$17^1/_4$"	24"	shelves
1	C	$^3/_4$"	$18^3/_4$"	25"	top shelf
1	D	$^3/_4$"	$12^1/_8$"	$27^3/_4$"	narrow top
3	E	$^1/_2$"	$8^1/_2$"	$44^1/_4$"	back boards
2	F	$^3/_4$"	2"	$29^3/_4$"	stiles
1	G	$^3/_4$"	$3^3/_4$"	25"	bottom skirt
1	H	$^3/_4$"	$^1/_2$"	$23^1/_2$"	top trim
1	I	$^1/_4$"	$1^1/_2$"	25"	dust stop
1	J	$^3/_4$"	$1^1/_4$"	84"	moulding stock
2	K	$^3/_4$"	$10^1/_2$"	$29^3/_4$"	doors
4	L	$^3/_4$"	2"	9"	door battens
2	M	$^3/_4$"	dowel		door pulls
1	N	$^3/_4$"	$^3/_4$"	$2^1/_2$"	door lock



The door pulls (M) are simply turned or carved from a 3/4" diameter dowel as shown. Since they were originally made by hand, they do not have to exactly match each other. Locate and drill a 3/8" diameter hole, 2" down and about 1" in from the edge on each door. My door pulls are held in place by a small square-cut nail inserted through a 3/32" diameter hole - a method I'd seen used on other antiques.

Cut or carve out the door lock (N). Again, this was usually somewhat crude and does not have to be exact. Attach it to the right–hand door with brass screws. This locks the left-hand door; the right–hand door is held closed and locked by a small hook and eye located inside the right-hand door and below the top shelf.

Most dry sinks were stained, but some were painted. If you choose to paint yours, use an early American color.

To make my dry sink look old, I filed worn spots and made scratches before applying the stain and finish. After distressing it, sand it all over. Wipe it clean before applying the stain coat. I used an Ipswitch Pine stain followed by three coats of satin finish tung oil. To add that 150–year old effect, I wiped on a wash coat of thinned black paint which I wiped off right away, leaving the black paint in the corners and in all the distressed marks and scratches. Do not let the dry sink finish become too shiny - it should have a satin finish. If it does get too shiny, simply steel-wool the piece with #0000 steelwool.

After the tung oil has dried, apply a coat of lemon oil - do not wax over tung oil.

Remove the center back board, and install the television set and VCR. With the center board removed, it is very easy to route the connectors from one set to the other and to route the wires down and out to the electrical power outlet. Then replace the center board.

All electrical devices, most certainly television sets and stereos, have heat–generating components. Proper ventilation and adequate air flow is required to keep your set from over-heating. Do not make your cabinet an absolutely perfect fit; allow plenty of clearance, and leave the doors open for a few minutes after you turn off the set and video player to let air circulate behind them. PW

Handcrafted Furniture From the Sea

by Ervin Hickman

Angry storms that invade Bandon, Oregon on the Pacific Ocean occasionally spew treasures of driftwood along the beaches. The town of 2,350 is situated in a natural scoop formed by Cape Argo and the ocean.

One recipient of this treasure trove is Bill Magness, a collector of driftwood for the past 25 years. With the aid of other beachcombers, Magness gathers up gnarled and weathered pieces of redwood burl, spalted maple, and quilted fir, among other choice woods that survive the ocean journey along the Oregon Coast. Ultimately, he hopes to house his huge collection of flotsam in a museum.

"Trees are beautiful, dead or alive," the collector points out. "We have many kinds of native wood here: myrtle, maple, spalted willow and alder, Douglas fir, budded and quilted Oregon redwood, spruce, and budded hemlock as well. Rhododendron is one of the most beautiful, along with golden heart." He also has a piece of burled white cedar for which someone once offered him $3,500.

Some of his treasured wood is stored with friends since his home has run out of storage space. A star–shaped pattern of white cedar root leans against a wall near a pile of redwood planks with quilted grain that's drying on his living room floor.

But Magness doesn't just collect driftwood for the sake of collecting. Together with his partner Michael Smith, he converts the driftwood into lumber which Smith uses to make fine furniture.

"I sell about fifty per cent of my crafted furniture to tourists and the remainder through galleries up and down the Pacific Coast," Smith declared. He says that driftwood is hard on tools and hard to work with because sand and gravel are imbedded in it. Sometimes he uses a water blaster with 2,000–pound pressure to clean out the wood.

"As for the drying out process," he said, "driftwood dries at the same rate as regular lumber – about one inch per year."

Smith recently bought a piece of burled ash that is 27" across and 16 feet long. This driftwood was picked up by a commercial fisherman using a crane off the beach. Smith bought it for $100. "A rare find and well worth what I paid for it," he declared.

"I like to make furniture that shows off the grain of the wood, like this chest of drawers" (pictured at right). "It's made from a spalted maple log found on the Coss River, not far from the ocean." Smith is currently working on a hutch made from Philippine mahogany with large wormholes made by gribbles – crustaceans that nibbled on it in the ocean.

Magness and Smith once tried an experiment with alder. They cut down a tree, converted it to lumber, then stacked it

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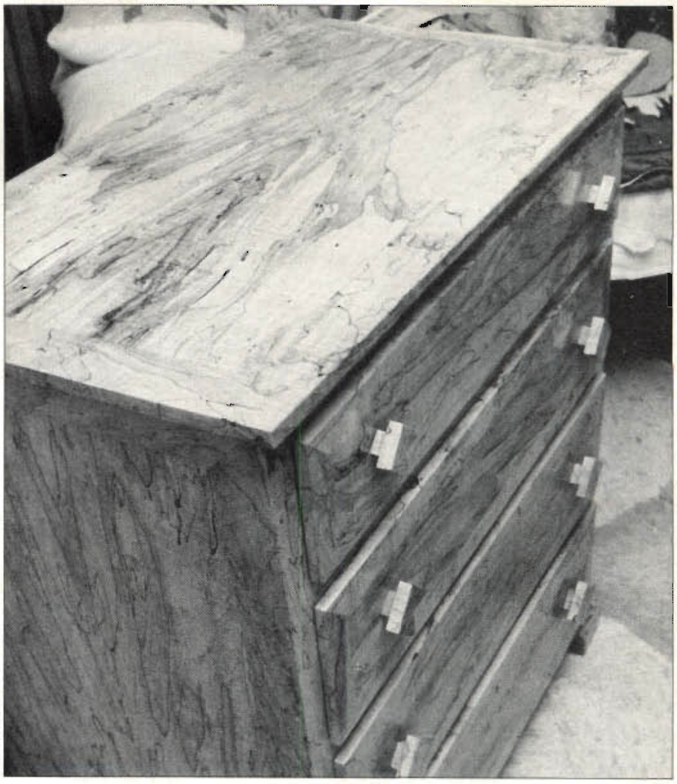
***Ervin Hickman** is a freelance writer from Smithville, Texas.*



photos by the author

face–to–face outside for about 8 months. "When the stack was taken apart," Smith said, "the spalted alder was workable and quite lovely."

"Abandoned by the Sea in Bandon–by–the–Sea, the Best Collection of Driftwood on the Oregon Coast," boasts the business card used by Bill Magness and Michael Smith.

"Steinbeck could have written 10 books about the beachcombers who salvage driftwood from the sea," claims Magness. "The old shipwrecks are about gone. The lignum vitae that was used for keel plates was the best wood," he said.

Both men concur in one belief: "They grow new people all the time, but they don't grow good driftwood much anymore." Not only has the sea already given up most of her shipwrecks, the supply of good driftwood is also becoming scarce due to the drying up of the lumber industry further up the Oregon Coast. Fortunately, the wood found by these two men is being put to good use. **PW**

Opposite Page: *Bill Magness walks along his ever–growing collection of driftwood.*
Left: *What was once bleached and plain driftwood is now a beautifully patterned piece of lumber.*
Above right: *This chest of drawers is a fine example of what the sea has in store for us.*
Right: *Michael Smith prepares a spalted maple board for the next project.*

Focus on Carving

Relief Carving—The Illusion of DEPTH

by William H. McMaster

Successful relief carving depends strongly on both perspective and foreshortening. In the last issue I discussed the methods for creating an illusion of distance through the use of perspective. This article will discuss how to create an illusion of **depth** through the use of foreshortening in the third dimension of sculpture.

The dictionary definition of foreshortening is "to shorten by proportionately contracting in the direction of depth so that an illusion of extension in space is obtained." Any surface which is not at a right angle to the line of sight will have to be foreshortened to some degree. There are many art books that describe how to do this in a two-dimensional picture, so we will not pursue that aspect. The method described here will start out following the dictionary definition to show you the initial steps proceeding from a two-dimensional representation to a relief carving which involves foreshortening in the third dimension.

The best method, of course, is to depend upon your own eye's interpretation. However, as Leonardo Da Vinci said, "Only the trained eye can truly see." Thus, by starting out in an admittedly mechanical way, let's hope this approach will help train your eyes to make it easier to carve accurately.

To illustrate the problems that occur in carving a foreshortened object, let's consider the steps involved in carving a tilted round object as illustrated in Figure 1.This shows both the front view and the profile of the object. The front view shows the two-dimensional representation; the profile shows the depth in the third dimension.

***William H. McMaster** is Chief of the Education Division of the California Carvers' Guild. His "Focus on Carving" is a regular feature in* PW.

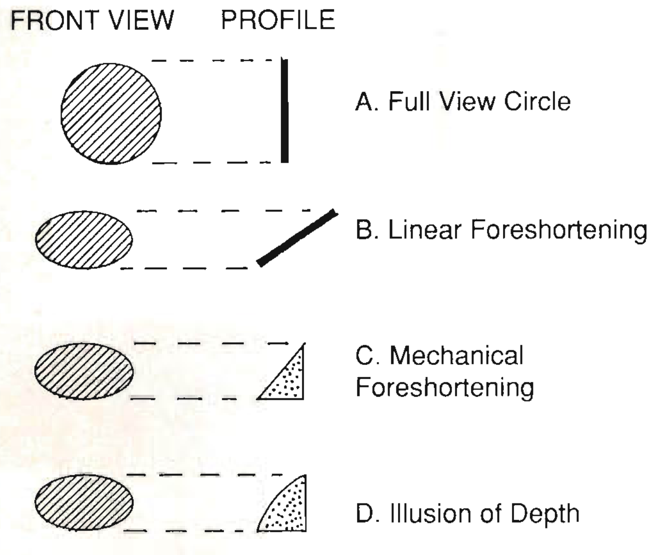


Figure 1. Foreshortening in Depth

In view A, we are viewing the circle straight on with no change in shape. If the circle is tilted away from us as shown in view B, then from the front we see an ellipse which is the two-dimensional foreshortening of a circle. In carving, the full depth to represent this circle is not always available, so the carver must foreshorten in depth also, as shown in view C.

If we evoke the three-dimensional perspective rule developed in the previous article of this series: "Direct depth representation of a flat surface in nature results in a **convex** surface in the sculptural third dimension," then the profile should be carved as shown in view D.

Figure 1 therefore illustrates in a simple way the principles of the method used for foreshortening in the third dimension. Since most carvers work from either photographs or sketches, the problem is determining the orientation of the object to our line of sight. Describing foreshortening in words leaves much to be desired, so I will illustrate practical methods of foreshortening with a few examples from carving projects. These will illustrate the procedures you will go through to lay out a foreshortened object.

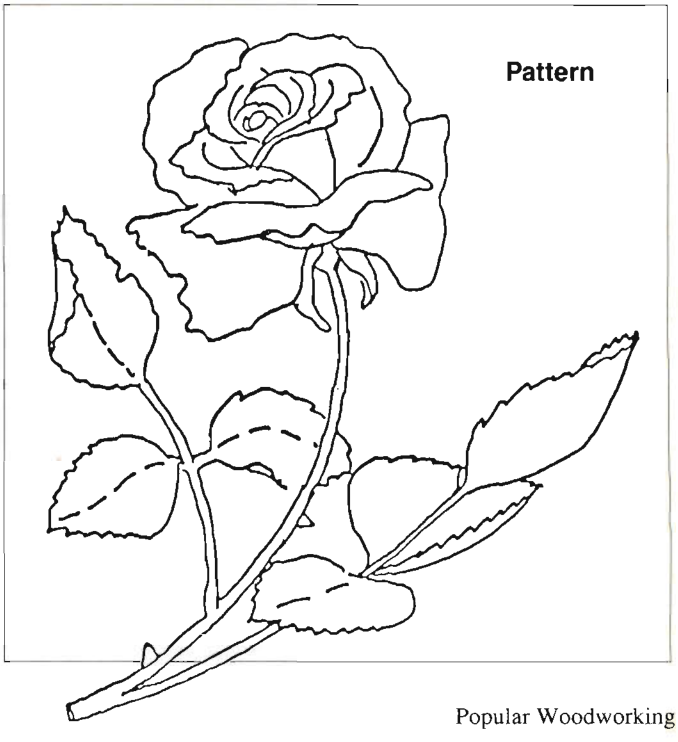
Releasing the Rose

A beautiful project to carve in relief is the rose shown below and in Figure 2. Most of this project can be done by eye, however the rose itself presents conceptual problems for most carvers.

When doing a work which involves foreshortening, very few sculptors can do **direct carving**, which is working down from the original surface to the details of the object. The best way to approach foreshortening is to lay out the orientation first, then do the projections necessary to foreshorten the object to fit into the depth of the carving wood.

The first step is to determine the angle from which the rose

illustrations by the author



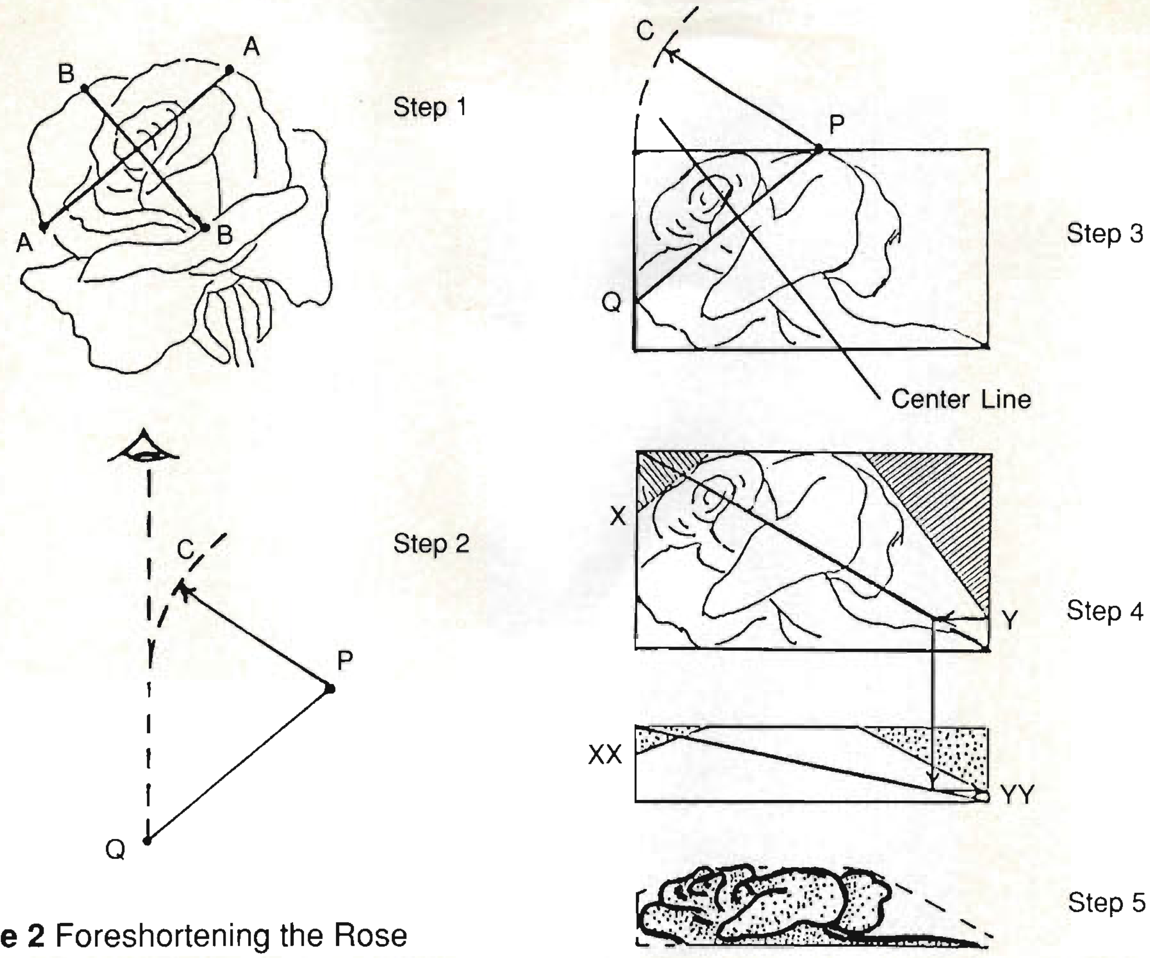


Figure 2 Foreshortening the Rose

is being viewed. To do this you must work from some fact or assumption about the rose; in this case, let's assume that the blossom is circular when viewed from above. Thus we know that we are looking at an ellipse like the circle in Figure 1. We must then find the tilt of the circle which will produce this ellipse. This is done by first estimating the location of the two axes, as illustrated in Step 1 of Figure 2, with perpendicular axes AA and BB. AA represents the full diameter of the circle, while BB is the direction in which it is foreshortened.

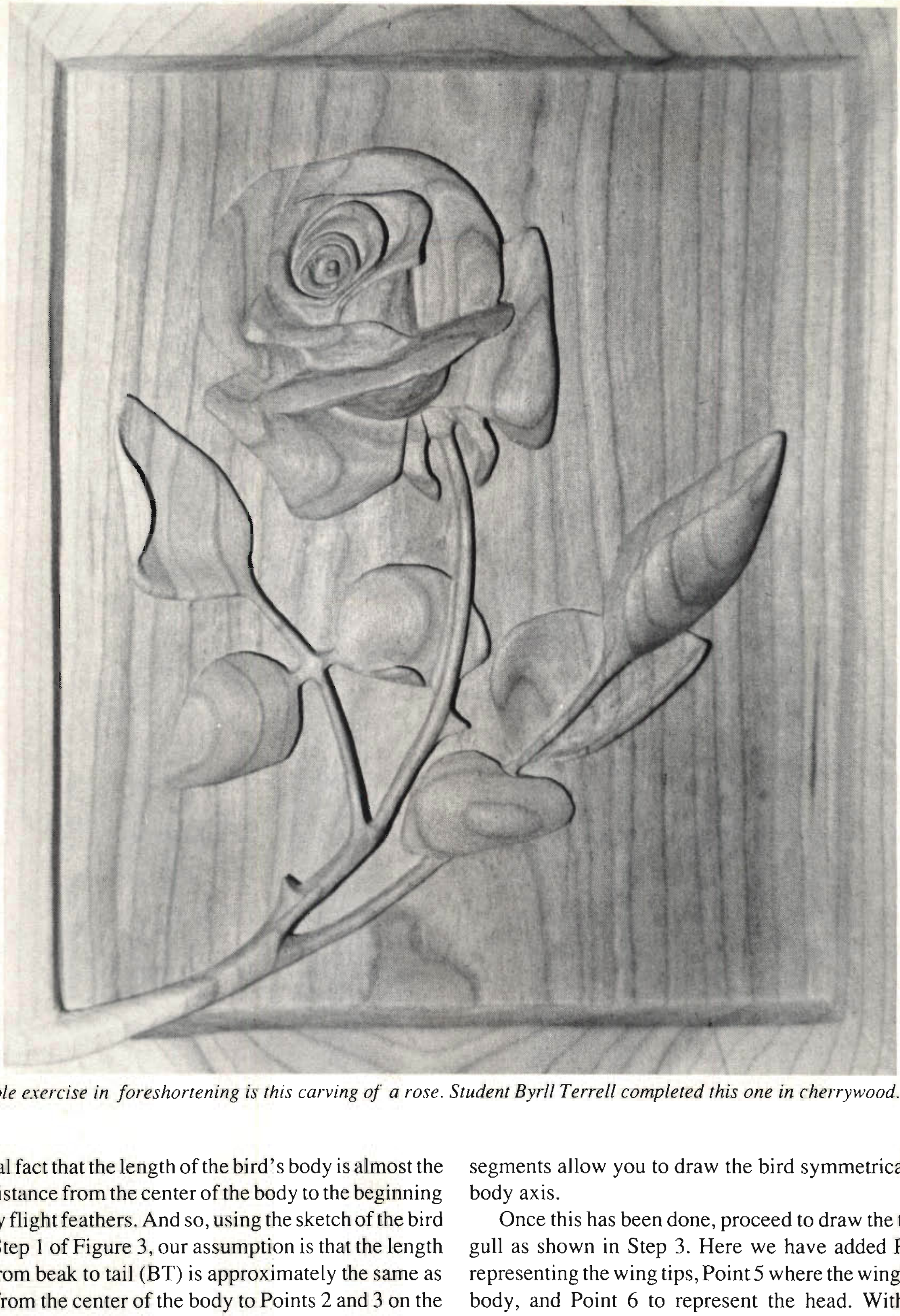
The next step is to draw the profile of the rose (i.e. in cross-section) to determine the viewing angle. Lay out line PQ which represents the diameter of the circle and the major axis of the ellipse. This is the same line as BB in Step 1, but has the length of AA since it's the full diameter of the rose. Then, with a compass set to the length of the other axis (BB), swing arc C around point Q. By drawing the tangent to the arc from point P, we have established the line-of-sight (LOS) from which the rose is being viewed (Step 2). Next make a sketch of the rose symmetrically about the center line to PQ as shown, and enclose it in a box (Step 3). This represents the full rose in cross-section. You can now lay out its carving region as shown by the shaded areas in Step 3. If you were to carve the rose with full depth, these shaded areas would be the first cuts to outline the orientation. It is always important to first establish this direction before starting to carve.

To foreshorten the rose so it can be carved in the depth available in the wood, draw a new box that is the thickness of your carving as shown in Step 4. Foreshortening to the depth of your carving wood requires that you determine the depths of the first two cuts, X and Y. This can be done in several ways. You may use ratios (the method of squares and rectangles) to represent the contracted square or, as I prefer, the reflection method. In this method, first draw in the diagonals of your two boxes as shown in Step 4. These diagonals are your reflection lines. To find a location in the foreshortened box, such as Y, draw a horizontal line from this point over to the reflection line, then down vertically to the next diagonal, and finally back horizontally to below the original point. In this manner, you can find points XX and YY in the foreshortened box. When this is done for the major features of the rose, the cross-section view of the rose as it will be carved should look as it does in Step 5.

Before carving, use your layout to make a clay model. This will aid you in the carving, plus provide a way to visualize how the rose will look.

Foreshortening a Flying Gull

In this example, let's say you have a photograph of a flying gull which you wish to incorporate as part of a relief carving. Since the view is neither from the side nor front you know that the foreshortening is not straight forward, therefore you must first determine the bird's flight pattern in order to carve it proportionately. Just as before, when we made the assumption that the rose was circular when viewed from above, we will use



A valuable exercise in foreshortening is this carving of a rose. Student Byrll Terrell completed this one in cherrywood.

the anatomical fact that the length of the bird's body is almost the same as the distance from the center of the body to the beginning of the primary flight feathers. And so, using the sketch of the bird as shown in Step 1 of Figure 3, our assumption is that the length of the body from beak to tail (BT) is approximately the same as the distance from the center of the body to Points 2 and 3 on the wing.

We use this information to determine the orientation. First, drop parallel vertical lines from these four known points on the bird's body. Lay out two perpendicular lines on a clear sheet of plastic, one representing the body and the other the wings. These lines have no definite length at this time. Mark scaling points on the line representing the wing, starting at the body axis and going in each direction. Then place the piece of plastic over the four vertical lines and rotate it until the section representing the body is equal to the part representing each wing segment. The final result is as shown in Step 2 of Figure 2. The numbers on the wing segments allow you to draw the bird symmetrically around the body axis.

Once this has been done, proceed to draw the top view of the gull as shown in Step 3. Here we have added Points 1 and 4 representing the wing tips, Point 5 where the wing attaches to the body, and Point 6 to represent the head. With these points established, you can draw the profile of the top view of the bird. This is the shape you must contract by foreshortening in the third dimension of depth. The contraction is done, again by means of reflection off the diagonals, with the result as shown in Step 4. There are two profiles shown, one for the highest points and the other for the body.

The final step is to build a clay model of the foreshortened bird from these profiles. I like to use a profile gauge to help construct the clay model. The photograph at right shows the profile gauge and the finished clay model, and the photograph far right shows the profiler being used to check the highest points

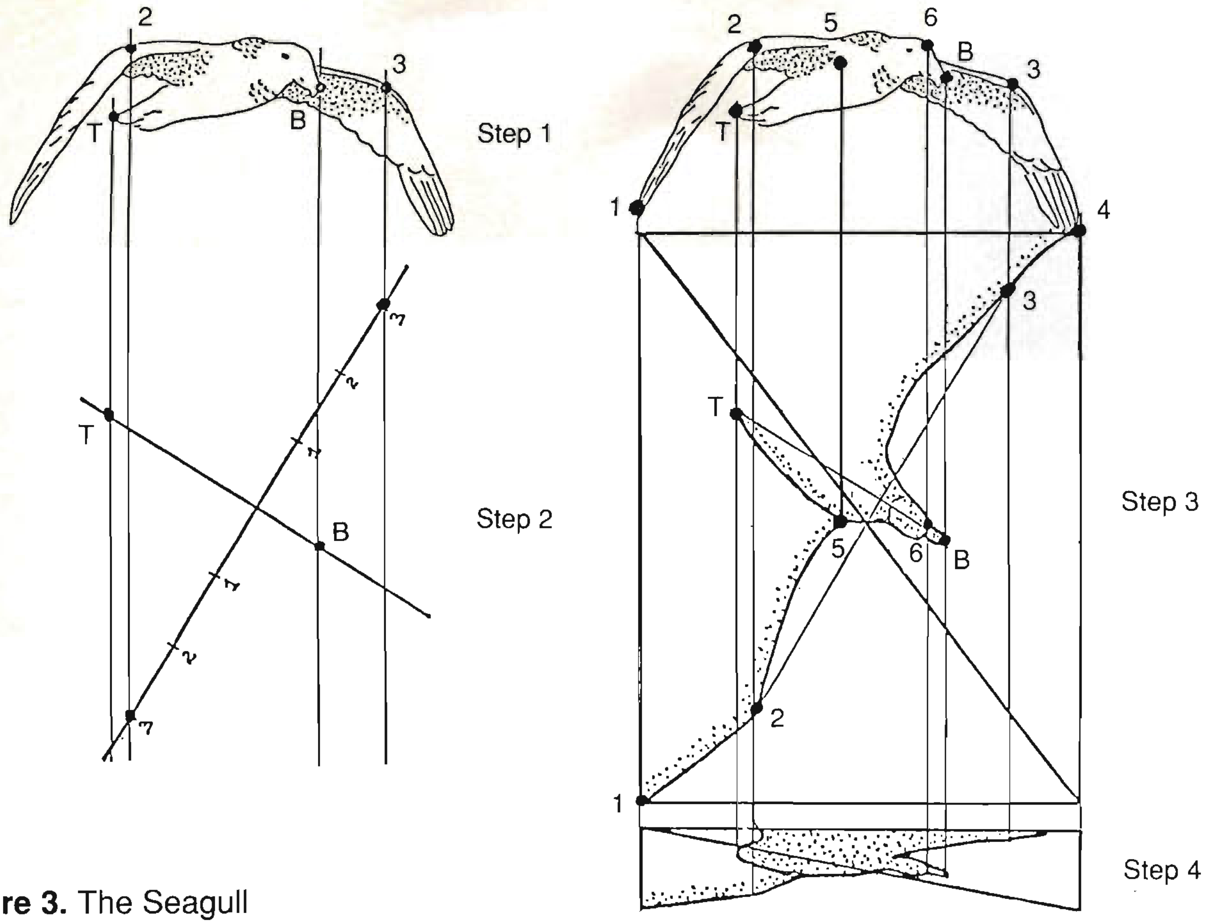


Figure 3. The Seagull

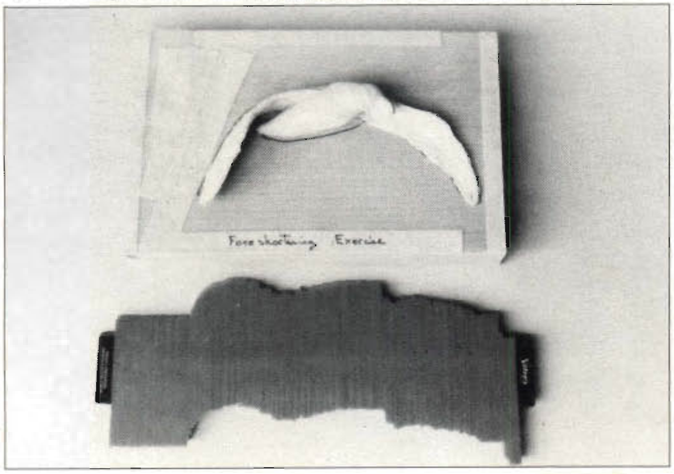
on the model. I prefer to use the 12" plastic gauge with clay rather than the ones with the wire probes because the plastic sliders work better on the soft surface of the clay. Once the clay model is constructed from the mechanical foreshortening, final adjustments in the design can then be corrected to satisfy your eyes before committing the project to wood. You will find that the step of making a clay model will greatly speed up the carving process, since you already know what it is supposed to look like. When the clay model has been finished, change the profile gauge to fit so it can be used to guide the woodcarving.

The Face in Three-Quarter View

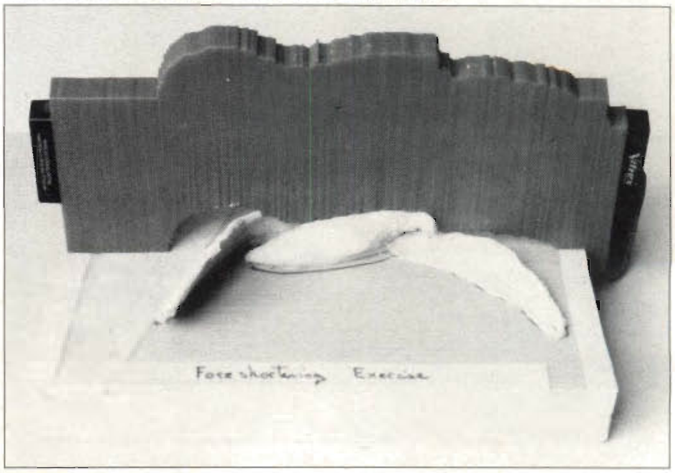
Probably one of the hardest carvings to do is the turned head. The example for this exercise is shown in Figure 4. Here again, the first problem is to determine the orientation of the head. For this, we will use the cross-sectional view of a standard head as developed in the series "Carving the Human Head" (*Popular Woodworking*, April/May 1986, Issue #30, Figure 2).

The method of determining the orientation of the head is

Set a profile gauge to the shape you arrive at after determining the contraction by following the steps in Figure 3.



Then use it to help you construct a clay model.



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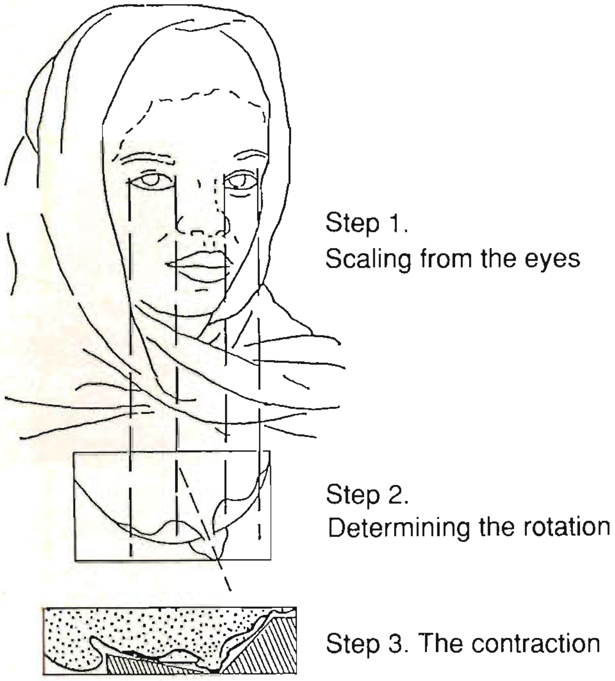


Figure 4. Foreshortening the Face

shown in Step 2 where the eyes are used as our measurement guide. Remember when doing this that all people have variations from the norm; you can see this in the illustration. In the pattern the model's nose is broader than that shown in the cross-section. When doing your matchings, you must take these variations into account.

In this case, the rotation was determined by taking the ratios of the widths of the two eyes as viewed. The top-view cross-section of a standard head was rotated until these ratios matched. The final step was to make the sizes match. In this case it was done on a reducing copier and is shown as Step 2; however, it could have been done just as well by using the method of squares.

Again, I used the reflection method to contract the features and to determine the first cuts to lay out the carving area. The results are shown in Step 3. When making the clay model you will find that the nose and eyes will have to be made slightly more prominent than the mechanical foreshortening indicates. This will make the features more recognizable by enhancing the shadows.

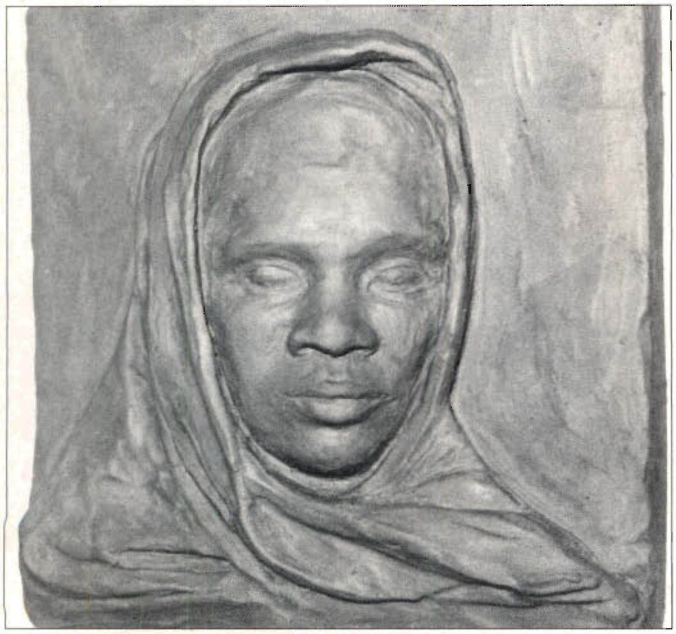
When the clay model has been made, the first cuts in the wood are to remove the shaded areas shown in Step 3 so that, when you start carving, the features will be in the correct orientation.

In this article I have illustrated a mechanical method to do the foreshortening required to create an effective relief carving that is restricted in depth. These steps should be considered as the preliminary first step and not the final result. They are meant to get you started on the right track. You will find that the mechanical approach by itself will not always lead to satisfactory results. As the famous French sculptor Auguste Rodin put it, "It's the science of bumps and hollows. You make the hollows deeper and the bumps higher. It's all very tricky business because if you do it too much, you lose the feeling of unity." To make the carving effective, you will have to change the profiles derived mechanically to achieve the proper optical effect. The best way to do this is with your clay model.

In the carving of the Columbia Panel, there were many figures that had to be foreshortened. The photograph below shows the carving of the duck in this panel taken from a high angle to show the results of the foreshortening. Its foreshortening was determined in the method described here and then adjustments were made to give the correct impression to the eye when viewed as part of the total scene.

The next article in this series on relief carving will describe the design considerations and some of the carving techniques and special tools used in carving the Columbia Panel. PW

Student Richard Sperling sculpted this clay model as a carving reference after completing the steps in Figure 4.



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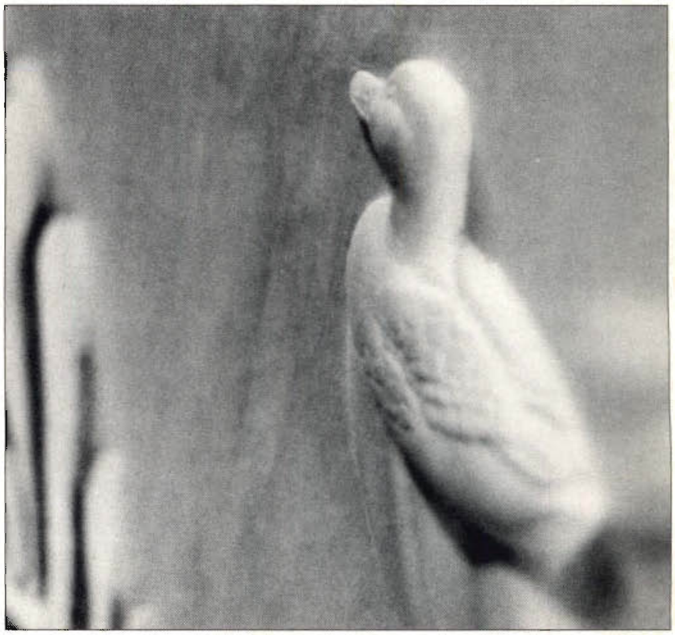
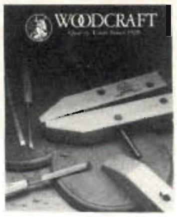
This duck from the author's "Columbia Panel" shows the results of foreshortening in a completed carving.





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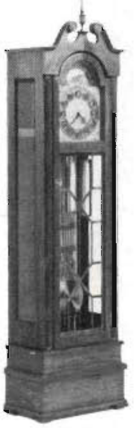

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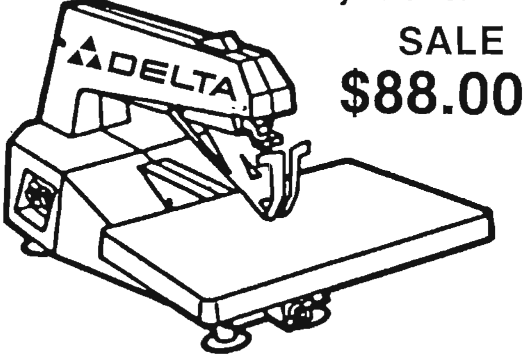

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February 5-7, Los Angeles, CA
Metro-Richmond Woodworking Show will feature machinery, power and hand tools, supplies, demonstrations, seminars, free workshops and more. For more information contact (213) 477-8521 (in California) or 1-800-826-8257.

February 12-14, Denver, CO
Colorado Woodworking Show will feature machinery, power and hand tools, supplies, demonstrations, seminars, free workshops and more. For more information contact (213) 477-8521 (in California) or 1-800-826-8257.

February 13-15, Washington, D.C.
1988 Spring Woodworking World Show. 4th Annual Washington D.C. Show at the DC Armory. For more information call toll free 1-800-521-7623.

February 19-21, Milwaukee, WI
The Greater Milwaukee Woodworking Show will feature machinery, power and hand tools, supplies, demonstrations, seminars, free workshops and more. For more information contact (213) 477-8521 (in California) or 1-800-826-8257.

February 27, Norman, OK
Bowl Turning by Alan Lacer. Between Center, March 5, 9:00 A.M. - 4:00 P.M. Tuition $30 each workshop. For more information contact Deanna Ewoldt, Moore-Norman Vo Tech School, 4701 - 12th Ave. NW, Norman, OK 73069 or call (405) 364-5763.

February 29-March 1, Portland, OR
Third Annual Workshop on Design, Operation and Maintenance of Circular and Band Saws at the Red Lion Inn, Lloyd Center, Portland, OR. For more information or brochures, contact Dr. R. Szymani, Workshop Leader, Wood Machining Institute, P.O. Box 476, Berkeley, CA 94701 or call (415) 943-5240.

March 1-April 9, Worcester, MA
Five major American craftsmen will present their work in the Gallery of the Worcester Center for Crafts. For more information and a brochure contact the Worcester Center For Crafts, 25 Sagamore Rd., Worcester, MA 01605 or call (617) 753-8183.

March 4-6, Montreal, Quebec
Canada Wood '88 Exposition will be held at the Palais des Congres de Montreal. For more information contact Paula R. Lee, Show Manager, Canada Wood, (203) 964-0000. Telex 649400 CAHEX WU STD.

March 4-6, Montreal, Quebec
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Atlanta.	April 8-9-10	Georgia Int'l Conv. Ctr., Atlanta
So. California	April 29-May 1	Los Angeles Airport Hilton
North Texas	May 6-7-8	Dallas Convention Center
Chicago	May 13-14-15	Pheasant Run Expo Hall, St. Charles
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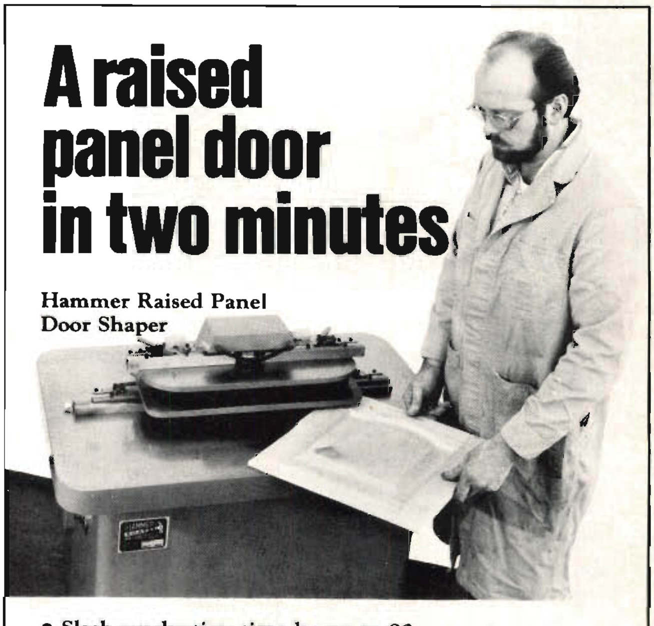

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March 11-13, Columbus, OH
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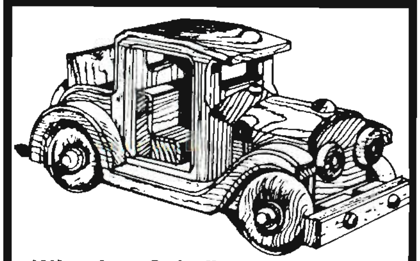

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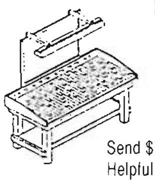

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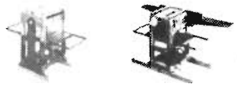

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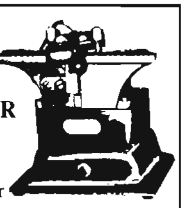

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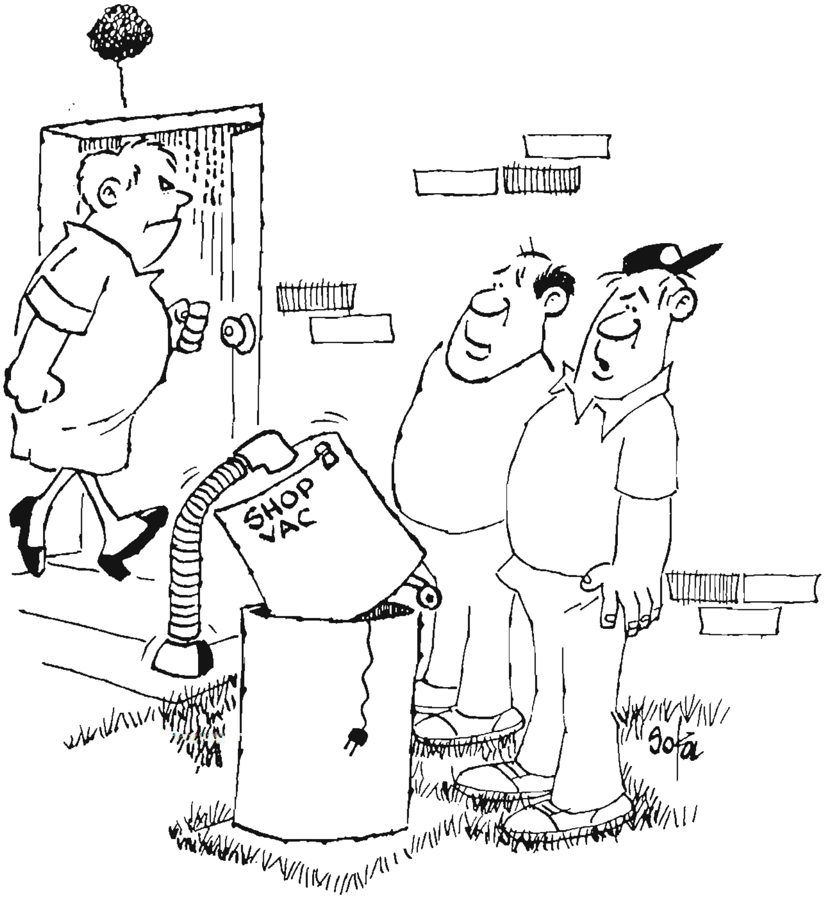

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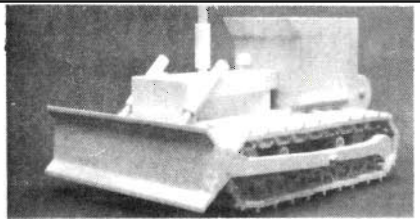

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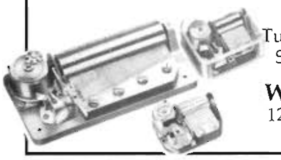

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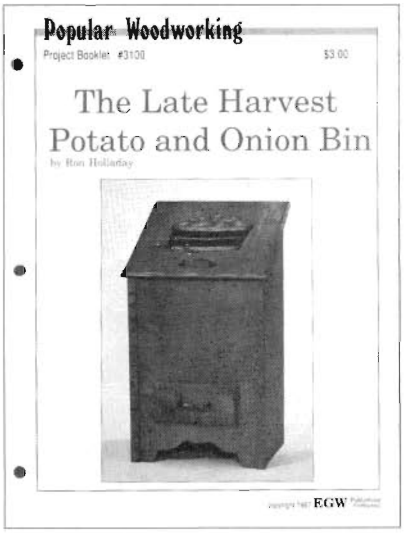

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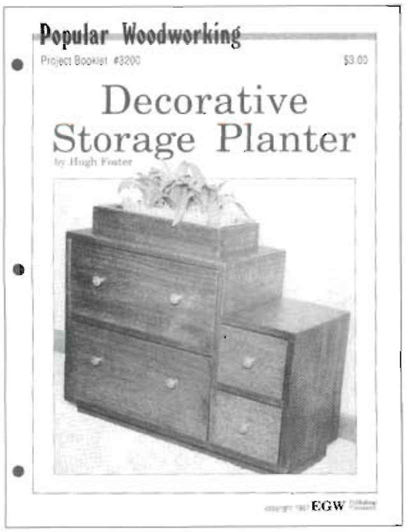

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Out of the Woodwork

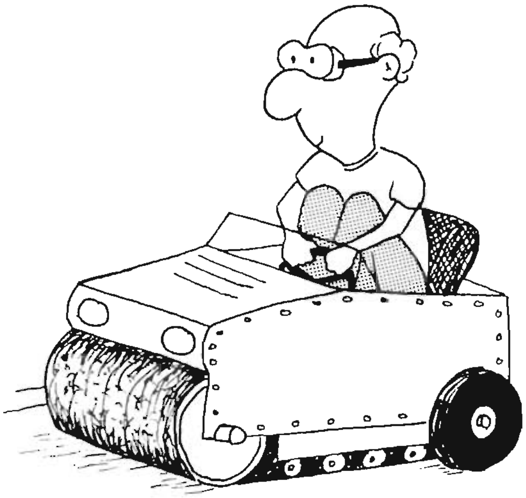
by Curt Mobley

Denser Moments in Woodworking History

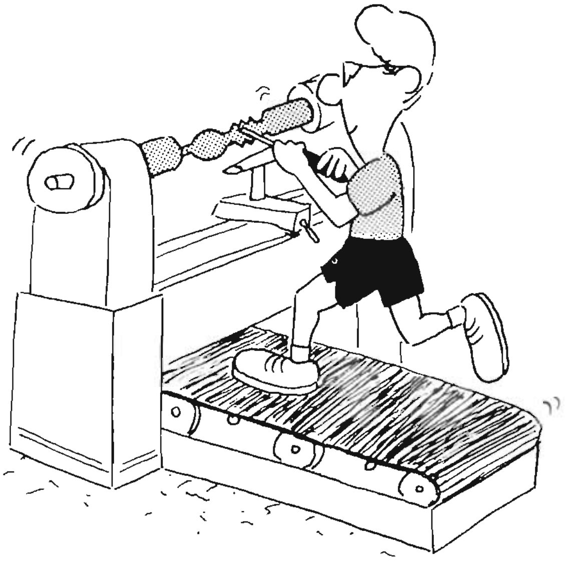
Throughout woodworking history there have been many bright moments and brilliant discoveries. These are often sighted by historians. They neglect, however, to note the thick attempts and dull moments that are all too common in woodworking. In an attempt to end this disparity, we present *Some Denser Moments in Woodworking History.*

50,000 B.C. :Trog was the first person to hit his thumb with a hammer. It is no coincidence that profanity was invented the same day.

1963: Bucky Halfbrite invented the square drill bit for drilling square holes. As seen here, he has yet to try out his new invention. (Bucky would later invent the solar–powered night light.)



1972: The riding belt sander was invented by Clarence Woodhead. Although originally intended only for use on hardwood floors, impatient woodworkers began using it on tabletops as well. This led to many unfortunate accidents when inadequately secured tables flipped over and faulty brakes sent riders flying off the edge. Later-model riding belt sanders came with a seat belt and roll bar, but it was too late. Lawsuits had been filed; the machine was outlawed; and Clarence Woodhead was out of business.



1985: Hoping to combine two of his favorite activities (running and woodworking) jogger Miles Airobik built a treadmill-powered lathe. Unfortunately, he miscalculated the gear ratio and had to run 137 miles in order to turn a single table leg. Apparently this was too stressful for Miles, who soon developed a severe case of shin splints and was forced to give up woodworking. PW

Tribute to a Shop Teacher

by Norma T. Balding

For well over three decades they have come....
Other people's sons:
Boisterous, brash, uncaring, insolent;
The lazy ones, the quiet ones, the defiant ones.
He takes them all, because they say he must,
This gentle giant, tough ex-Marine.
Into his shop, his classroom, his outsize hands.

"Teach them, shape them, train them,"
The counselors say. And so he tries.

And if he yells, and yell he does,
It is only that he cares. He wants
Kids to have BOTH hands
When they leave his shoproom door!

Amid the whirring motors, sanding dust,
Youthful sweat and woodsy scents...
Among the shavings on the floor,
OCCASIONALLY a diamond shines through;
A young mind grows, skills emerge
And pride in craftsmanship is born.
A few catch the spirit of creation,
The satisfaction from a finished piece;
Some revel in the lustrous sheen
Of hand-rubbed cherry, walnut and oak.

While other men build our bridges, skyscrapers, churches, roads,
His job is building character.
This teacher, with a lathe and knowing hands,
Turns a parquet bowl: Exquisite, lasting, satin-smooth.

And through the years, in his unique way,
Turns BOYS into MEN.

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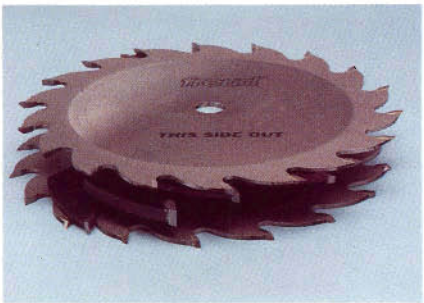

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